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Power Amplifier & Mixer Integrated System **DESIGN HANDBOOK**

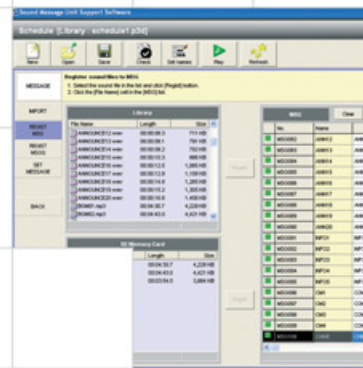




TABLE OF CONTENTS

1 **Concept**
P4 ~ P7

2 **System Examples**
P8 ~ P15

3 **Connections**
P16 ~ P43

4 **Products**
P44 ~ P73

5 **Block Diagrams**
P74 ~ P79

CONCEPT

SYSTEM EXAMPLES

CONNECTIONS

PRODUCTS

BLOCK DIAGRAMS

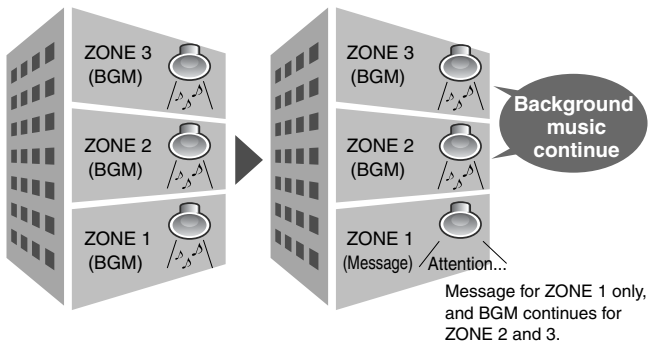
All-in-One Mixer and Amp

From the simplest to the most complex public address needs, the WA-MA120N and WA-MA240N have what it takes. These mixing power amplifiers combine multiple inputs with assigned priorities and call signs to provide the flexibility required for applications ranging from schools and business facilities, factory, office and religious buildings. To ensure more efficient and reliable communication, options including program broadcasting and troubleshooting.

2-channel Broadcast

Background music and announcement transmission can be transmitted independently to any of three zones, with background music transmitted to one zone and announcements transmitted to another zone.

*2-channel broadcast requires the optional WA-BA240N Booster Power Amplifier

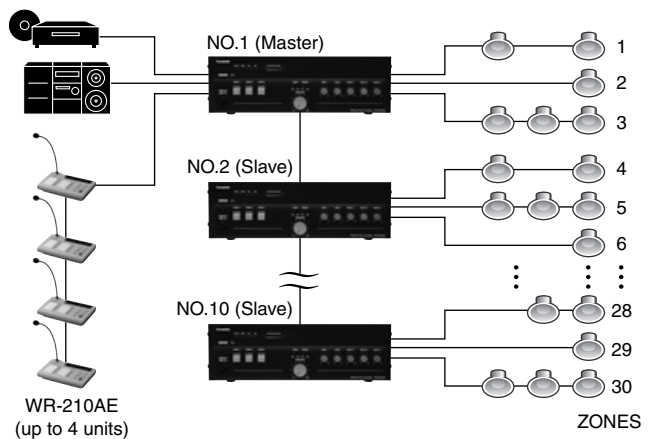


Up To Four Remote Microphones

Up to four (4) WR-210AE remote microphones can be used to broadcast from remote locations. These remote microphones can be used for individual, group, all-at-once or simultaneous broadcast.

Add Up To 30 Zones

Depending on scale of application systems may include up to ten (10) WA-MA120N or WA-MA240N mixing power amplifiers for expansion to up to 30 zones.



Broadcast Simultaneously To Multiple Remote Areas

For example, facilities with multiple buildings can have a WA-MA120N or WA-MA240N installed in each building. Via the simultaneous broadcast BUS I/O connector, broadcasts can be directed to selected all buildings at once.

Program Broadcast

With the optional WU-ZM001E Sound Message Unit, an SD memory card can be used to store MP3 data to be broadcast for a week at specified days and times. The SD memory card holds 100 messages.

Troubleshooting

The optional WU-ZS001E Surveillance Unit checks at preset intervals (or 24-hours a day) for overheating and sound and speaker irregularities.



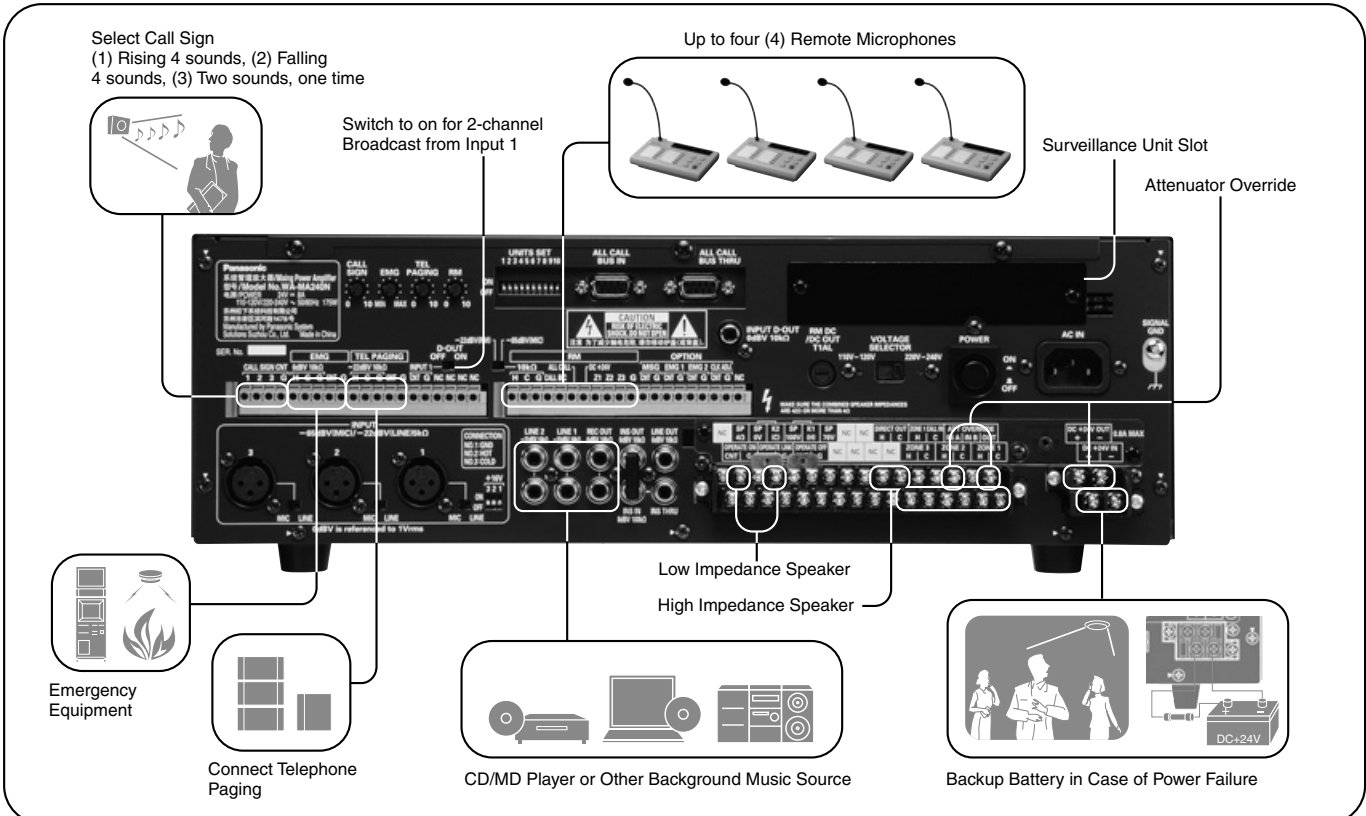
Reliable Cooling

Cooling fan control is provided by two thermal sensors monitoring temperatures inside the case.

Energy Saving Design

This mixing power amplifier uses Class-H amplifier technology developed by RAMSA, the Panasonic Professional Audio Group, to minimize power consumption.

The Public Address System Made it Easy.



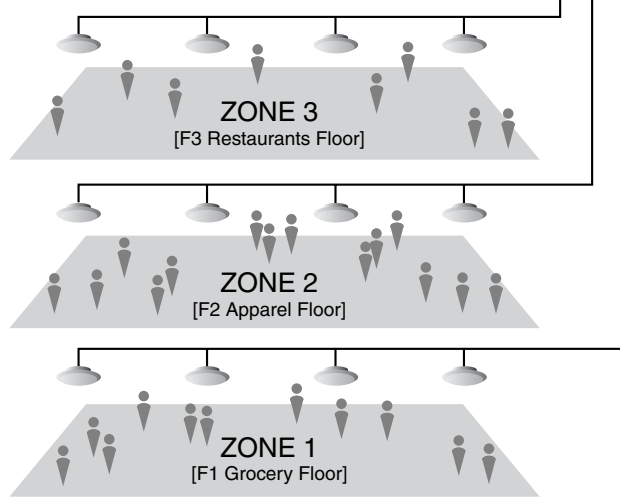
Basic Example

Priority Broadcast Feature Priorities are as follows.

- (1) Emergency announcement
- (2) Telephone paging, input 1, message from Sound Message Unit
- (3) Remote microphone
- (4) input 2, 3 and Line 1, 2

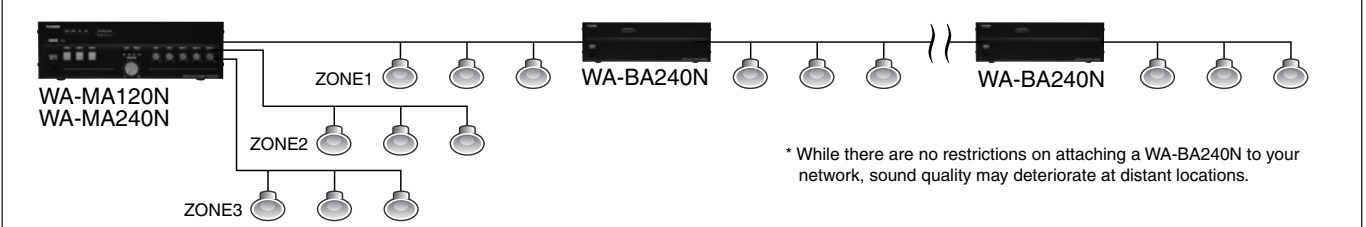
Higher priority broadcasts preempt lower priority broadcasts.

*When (2) and (4) occur simultaneously and inputs compete, mixing occurs. Sound level can be adjusted.



Cable Extension

When you need to broadcast to distant locations, the optional Booster Power Amplifier allows you to extend the speaker cable as far as necessary.

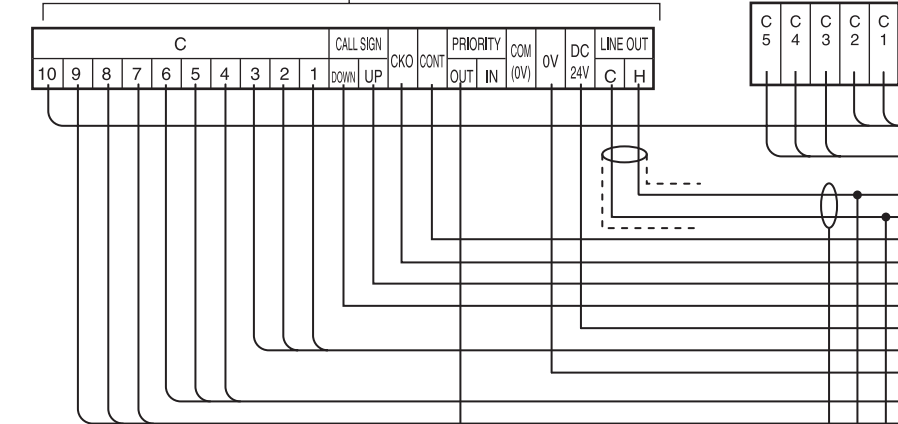
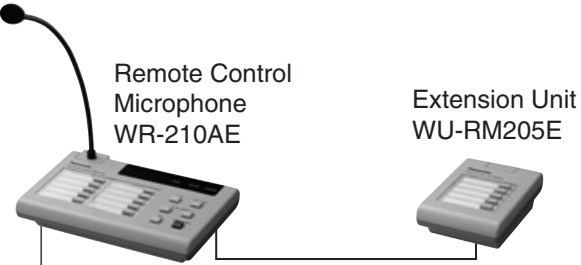


* While there are no restrictions on attaching a WA-BA240N to your network, sound quality may deteriorate at distant locations.

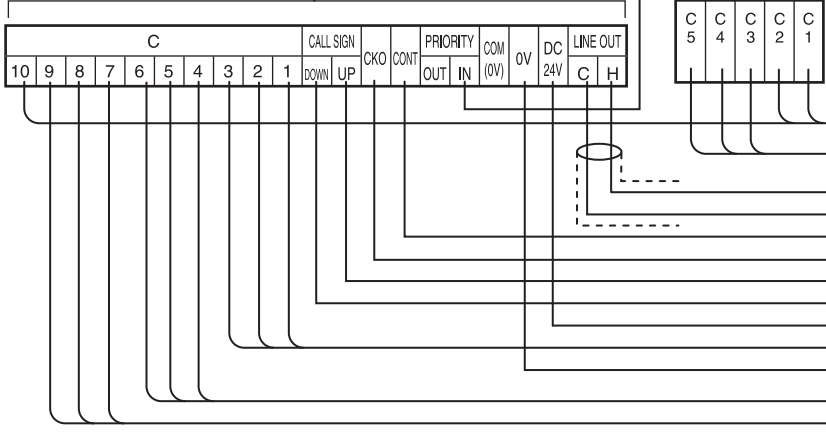
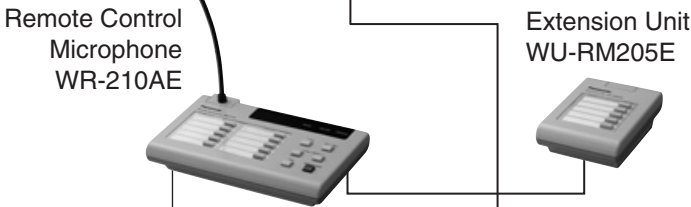
Mixing Power Amplifier (WA-MA120N/240N) Connection

Schematic diagram of Remote Microphone with Extension Unit (WU-RM205E) connected for announcements on 15 channels. The illustration in the broken line frame shows how to connect more than one Remote Microphones to Mixing Power Amplifier. Refer to this illustration for method of connecting up to 4 Remote Microphones.

Master



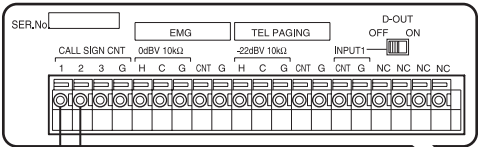
Slave



Important:

- Refer to page 38 and the Operating Instructions for the Amplifier for information on connecting Mixing Power Amplifiers (WA-MA120N, WA-MA240N).
- Use a crimp connector to group wires together if you need to connect more than one wire to the terminal.

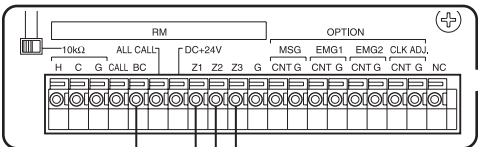
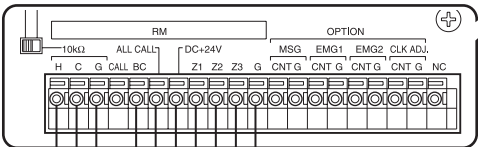
* Announcements can be made on a maximum of 30 channels by connecting 4 Extension Units, for a combination of 10 channels on the Remote Microphone and 20 channels on the Extension Units.



Mixing Power Amplifier
WA-MA120N/240N



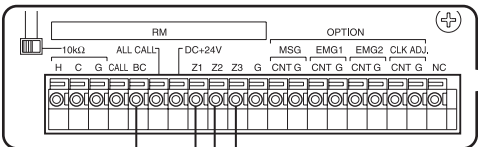
Amplifier (Master)



WA-MA120N/240N



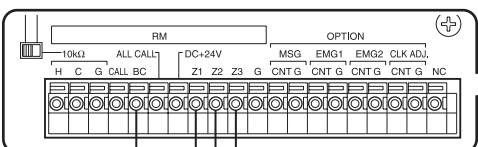
Amplifier (Slave 1)



WA-MA120N/240N



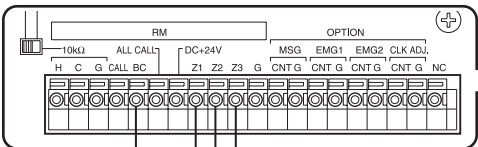
Amplifier (Slave 2)



WA-MA120N/240N



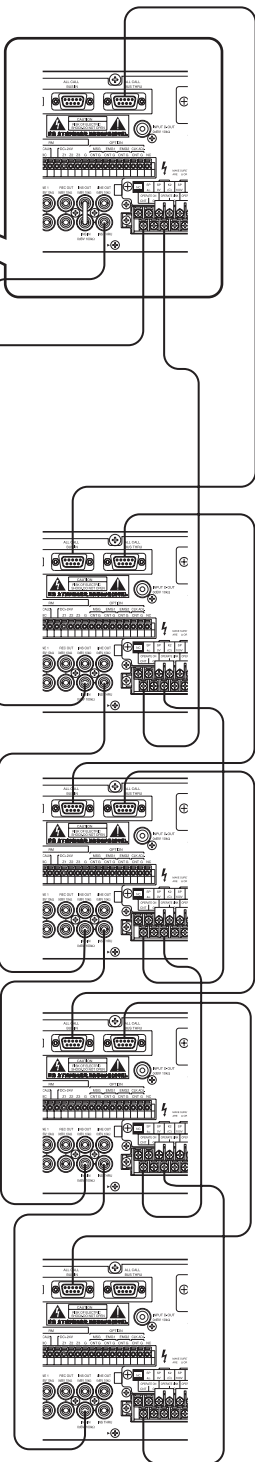
Amplifier (Slave 3)



WA-MA120N/240N



Amplifier (Slave 4)



KEY POINT

• Remote-controlled Microphone Connection

Allows remote microphones to be used for individual, group, all-at-once emergency, and simultaneous 2-channel broadcasts.

• Cascade Connection

Allows added amplifier capacity and additional speaker circuits.

• Simple Emergency Broadcast Announcements

Adding the optional Sound Message Unit to the master unit allows broadcast of emergency instructions and also supports turning off power to local amplifiers.

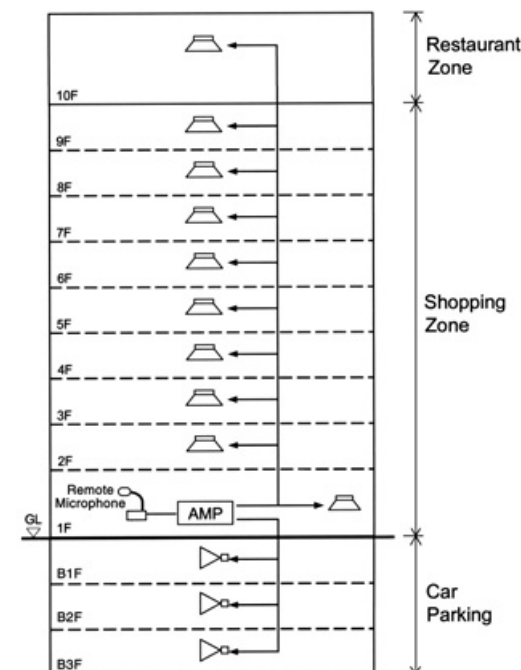
• Other Features

A chime is built into the master amplifier unit. The optional Sound Message Unit supports configuration of systems for regular broadcasts or simple emergency announcements.

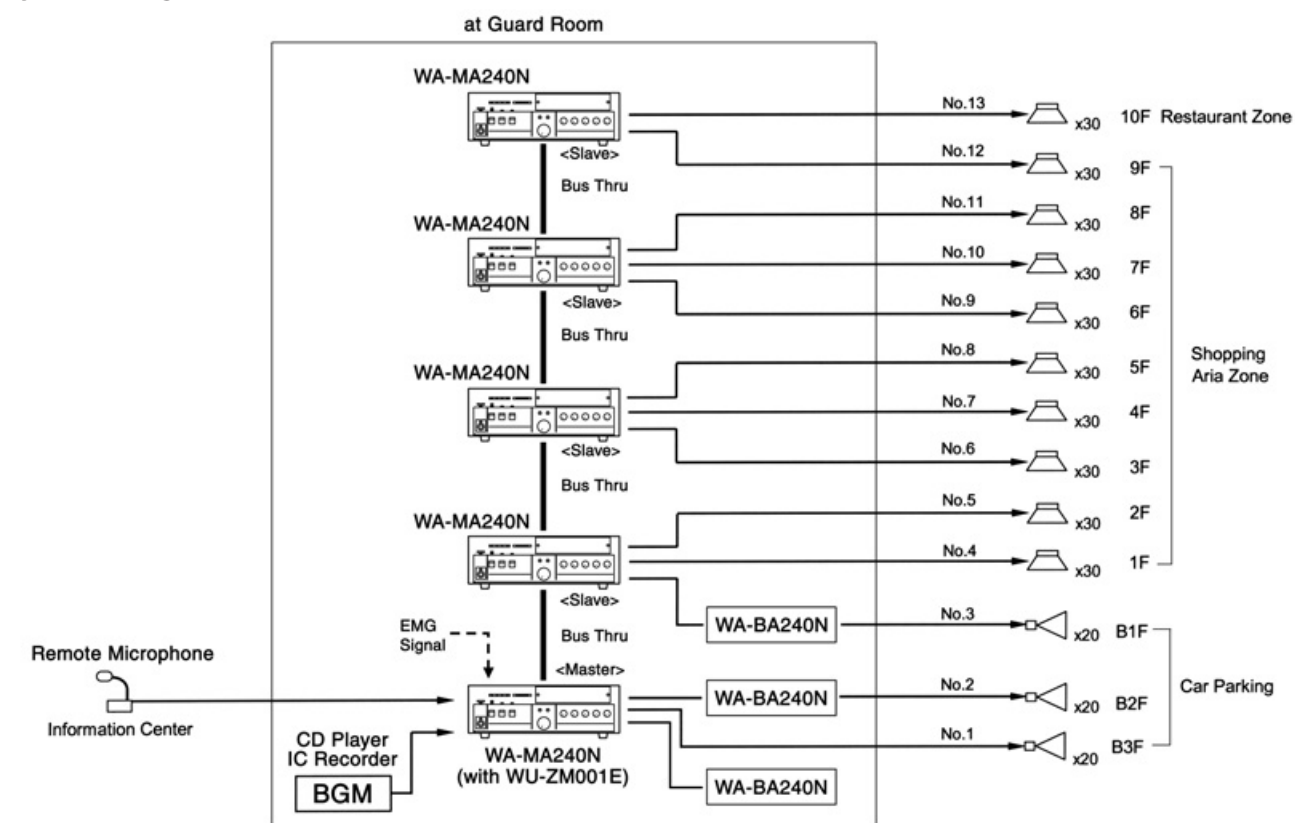
FEATURES

- Broadcasts background music.
- Mutes background music when remote microphone is in use.
- Extend the system throughout the entire building with additional amplifiers.
- Broadcast of instructions at regular intervals.
- In an emergency, an emergency message is broadcast to all zones.

Department Store Outline



System Diagram



KEY POINT

• Cascade Connection

Increases expansion capability to include all-zone broadcast to separate facilities.

• 2-channel Broadcast

Transmit a message only to the zone that needs it.

• Additional Amplifier Connection

Supports additional amplifiers when changes in layout require additional capacity.

• Remote-controlled Microphone Connection

Allows remote microphones to be used for individual, group, all-at-once emergency, and simultaneous 2-channel broadcasts.

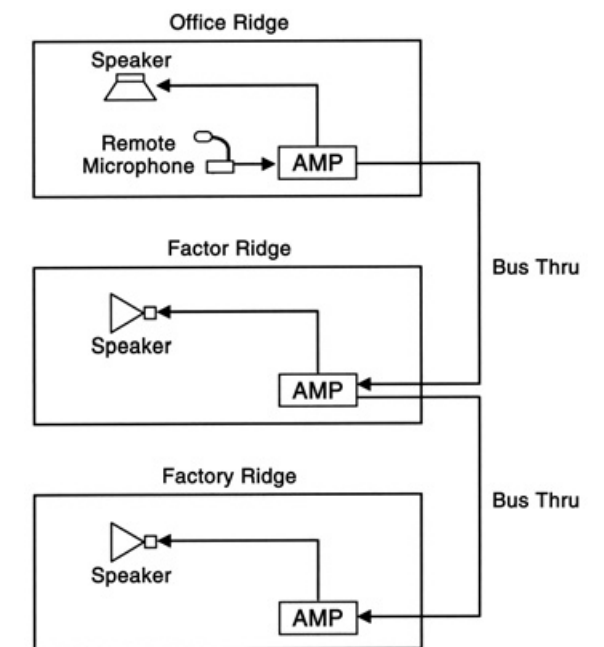
• Other Features

A chime is built into the master amplifier unit. The optional Sound Message Unit supports configuration of systems for regular broadcasts or simple emergency announcements.

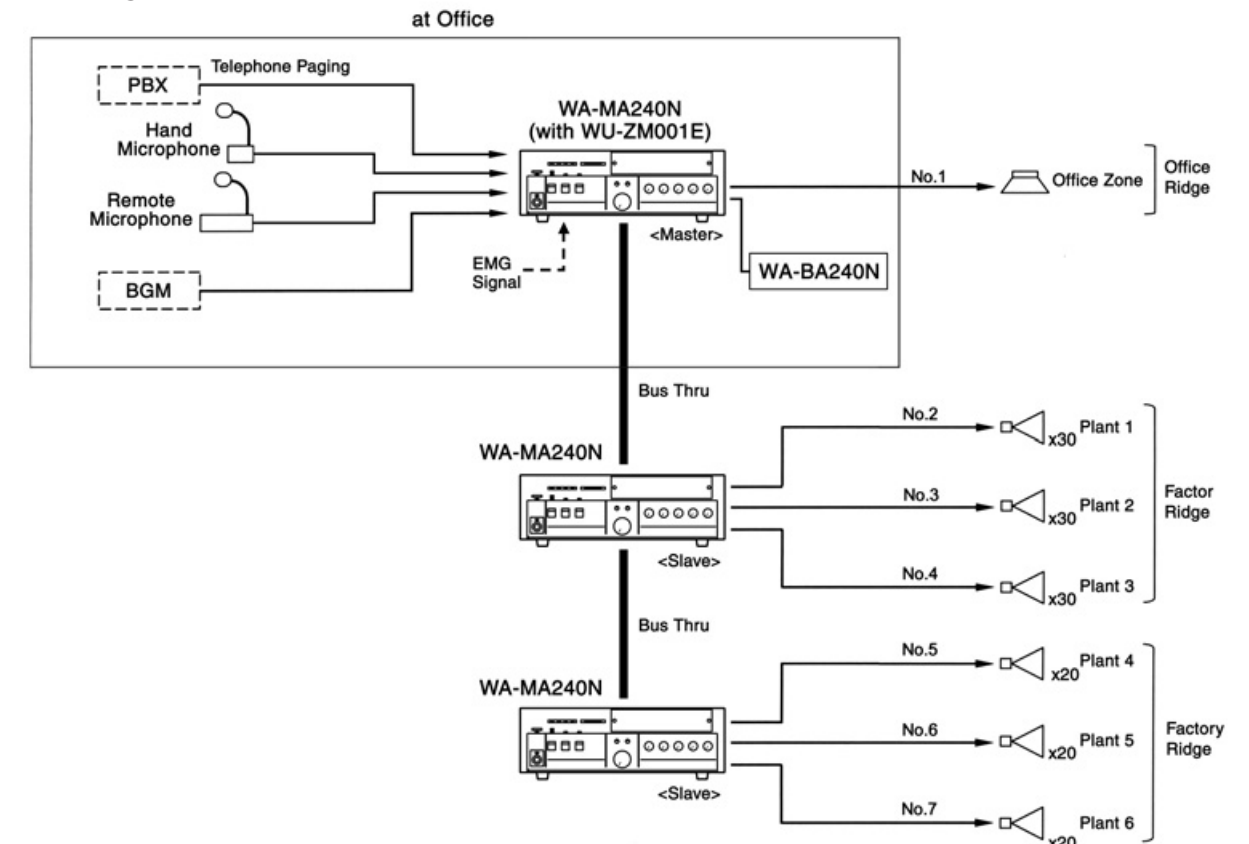
FEATURES

- Priority Levels (1) to (4)
- Allows all-zone announcements from master amplifier to slave amplifier.
- The remote microphone can be used for making announcements to specific zones and all-zone announcements.
Individual announcements x 7 zones
General announcements x 1 (All zones)

Factory Outline



System Diagram



KEY POINT

• Remote-controlled Microphone Connection

Allows remote microphones to be used for individual, group, all-at-once emergency, and simultaneous 2-channel broadcasts.

• Additional Amplifier Connection

When additional capacity is needed.

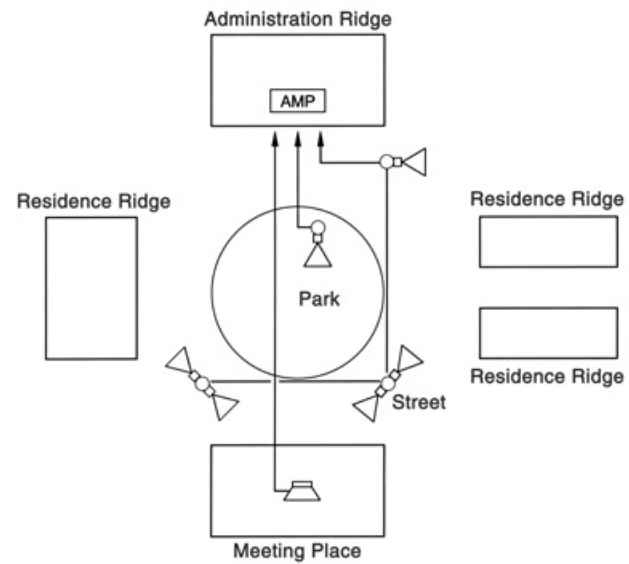
• Other Features

A chime is built into the main amplifier unit. The optional Sound Message Unit supports configuration of systems for regular broadcasts or simple emergency announcements.

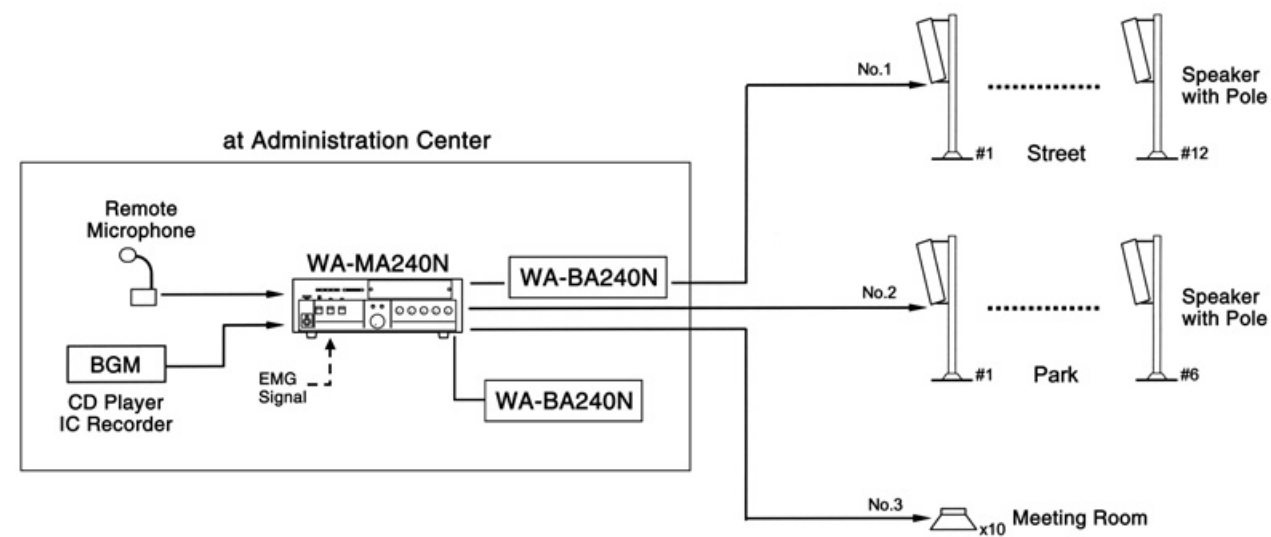
FEATURES

- Pages can be directed to individual zones.
- Broadcasts background music
- Chimes can be broadcast at regular intervals.
- In an emergency, an emergency message is broadcast to all zones.
- WA-BA240N supplementary amplifier can be added for areas where amplifier capacity is insufficient.

Residence Outline



System Diagram



KEY POINT

• Cascade Connection

Normal: Transmits individually to specific amplifiers.
Emergency: All-zone announcement.

• Remote-controlled Microphone Connection

Allows remote microphones to be used for individual, group, all-at-once emergency, and simultaneous 2-channel broadcasts.

• Additional Amplifier Connection

Supports additional amplifiers when changes in layout require additional capacity.

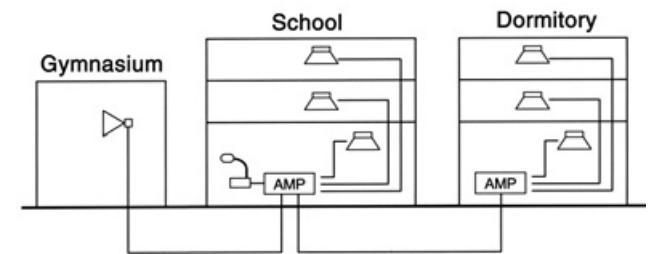
• Other Features

A chime is built into the master amplifier unit. The optional Sound Message Unit supports configuration of systems for regular broadcasts or simple emergency announcements.

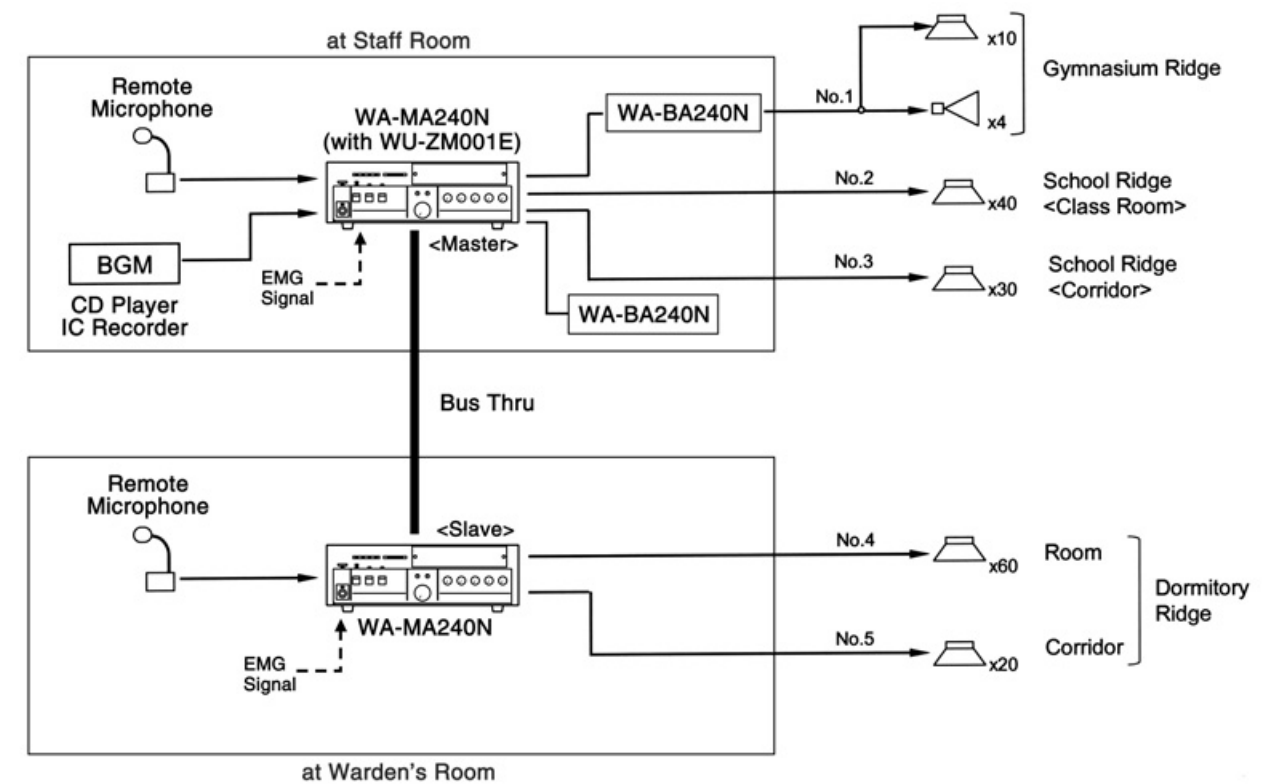
FEATURES

- Normal usage (transmit to individual amplifiers).
 - Staff Room → Gymnasium Ridge
 - Staff Room → School Ridge
 - Warden's Room → Dormitory Ridge
- Emergency usage (all-zone announcement to whole facility).
 - Staff Room → Gymnasium Ridge
 - Staff Room → School Ridge
 - Staff Room → Dormitory Ridge

School Outline



System Diagram



KEY POINT

• Remote-controlled Microphone Connection

Allows remote microphones to be used for individual, group, all-at-once emergency, and simultaneous 2-channel broadcasts.

• Cascade Connection

Allows added amplifier capacity and additional speaker circuits.

• Simple Emergency Broadcast Announcements

Adding the optional Sound Message Unit to the master unit allows broadcast of emergency instructions and also supports turning off power to local amplifiers.

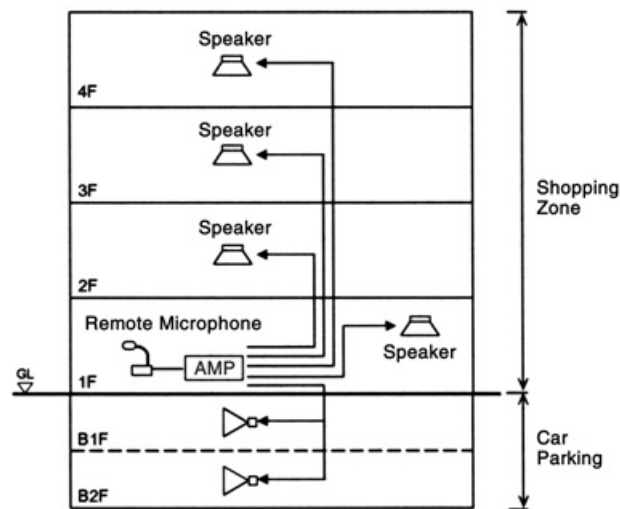
• Other Features

A chime is built into the master amplifier unit. The optional Sound Message Unit supports configuration of systems for regular broadcasts or simple emergency announcements.

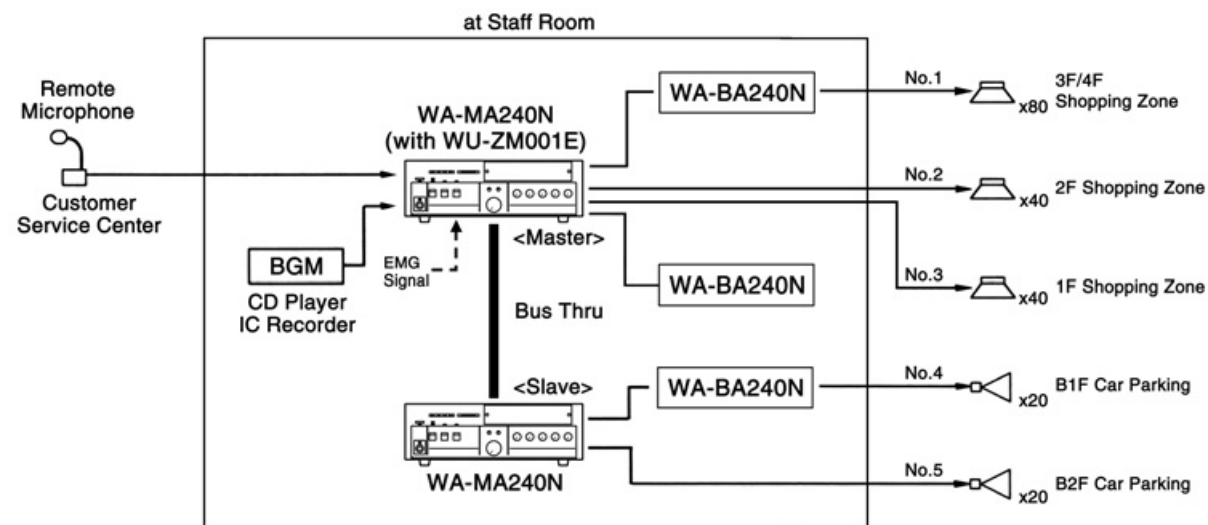
FEATURES

- Broadcasts background music.
- Mutes background music when remote microphone is in use.
- Extend the system throughout the entire building with additional amplifiers.
- Broadcast of instructions at regular intervals.
- In an emergency, an emergency message is broadcast to all zones.

Shopping Center Outline



System Diagram



KEY POINT

Public Address Paging System

• 2-channel Broadcast

Transmit a message only to the zone that needs it.

• Remote-controlled Microphone Connection

Allows remote microphones to be used for individual, group, all-at-once emergency, and simultaneous 2-channel broadcasts.

• Simple Emergency Broadcast Announcements

Adding the optional Sound Message Unit to the master unit allows broadcast of emergency instructions and also supports turning off power to local amplifiers.

Paging System for Parking

• 2-channel Broadcast

Transmit a message only to the zone that needs it.

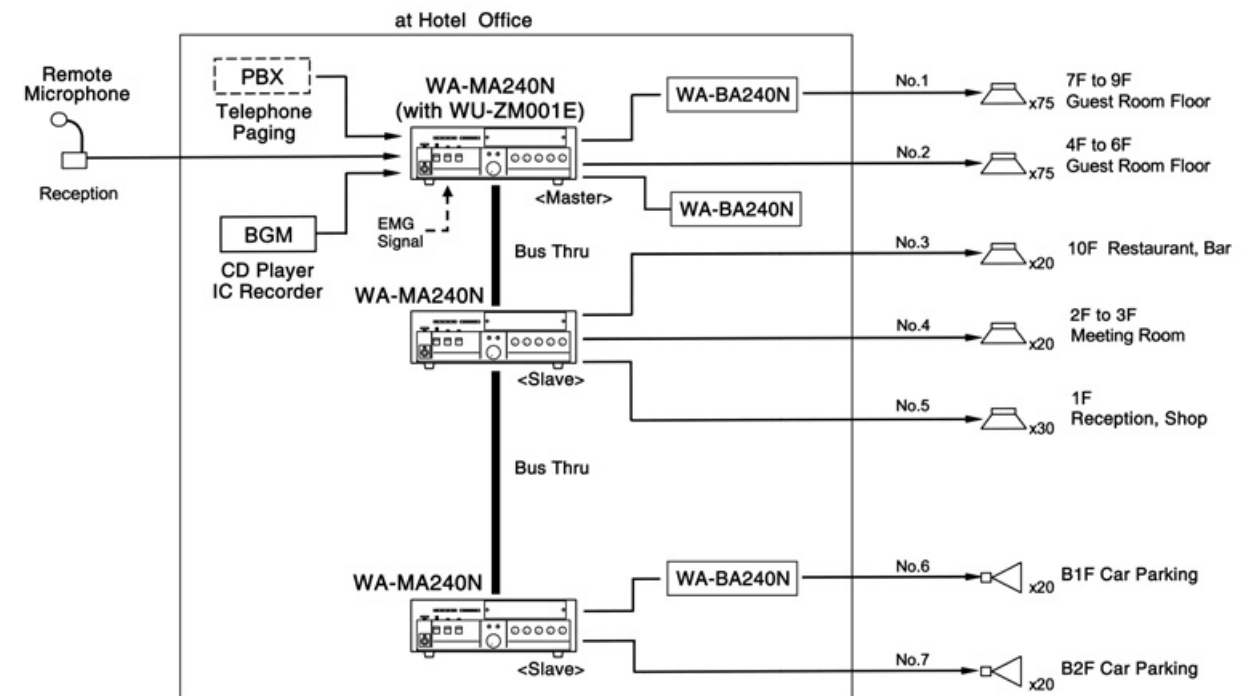
• Remote-controlled Microphone Connection

Allows remote microphones to be used for individual, group, all-at-once emergency, and simultaneous 2-channel broadcasts.

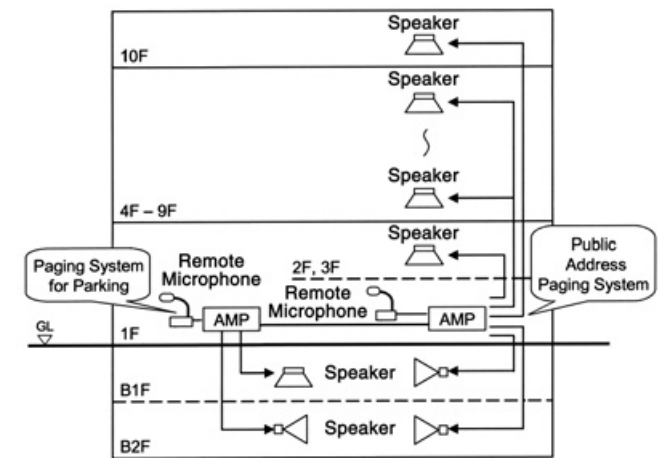
FEATURES

- Broadcasts background music.
- Mutes background music when remote microphone is in use.
- With additional amplifiers, broadcasts can reach the whole facility.
- In an emergency, an emergency message is broadcast to all zones.
- Emergency input can turn off power to local amplifiers.

System Diagram



Hotel Outline



KEY POINT

Public Address Paging System for whole facility

• 2-channel Broadcast

Transmit a message only to the zone that needs it.

• Cascade Connection

Allows added amplifier capacity and additional speaker units.

• Simple Emergency Broadcast Announcements

Adding the optional Sound Message Unit to the master unit allows broadcast of emergency instructions and also supports turning off power to local amplifiers.

Paging System for Parking

• 2-channel Broadcast

Transmit a message only to the zone that needs it.

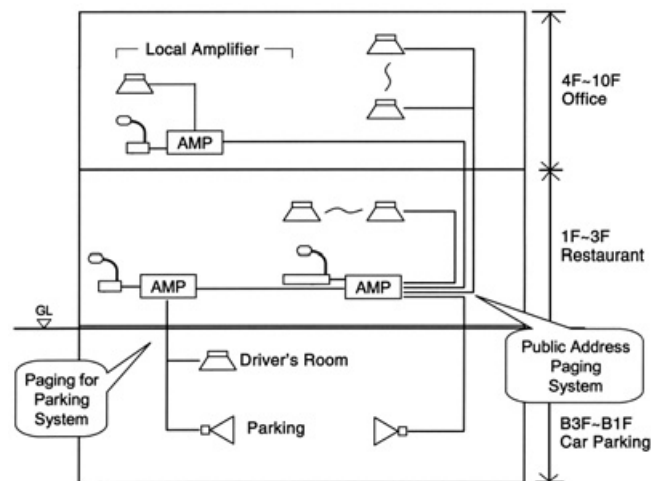
• Cascade Connection

Allows added amplifier capacity and additional speaker circuits.

FEATURES

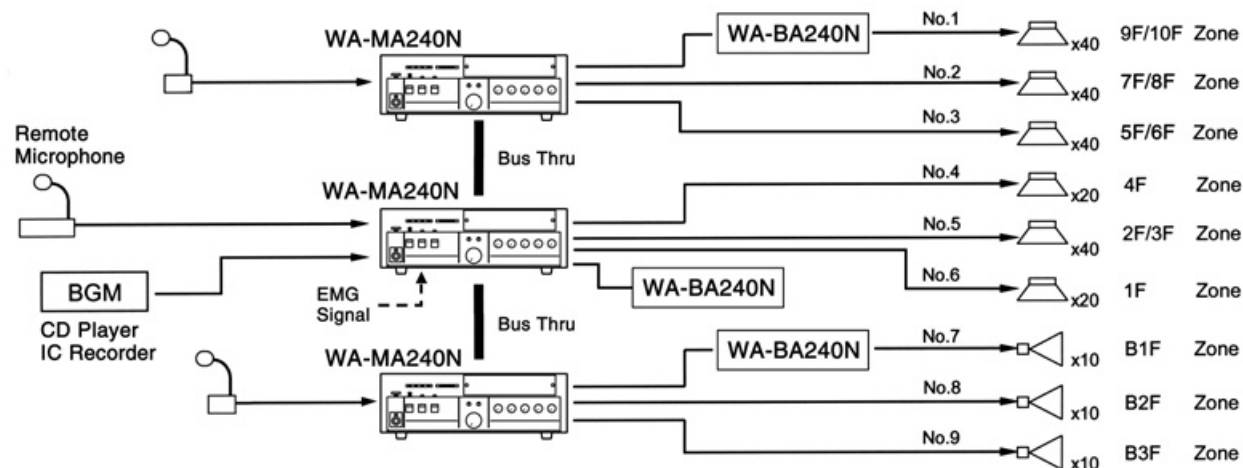
- Mutes background music when remote microphone is in use.
- Emergency input turns off power to local amplifiers.
- Amplifier capacity can be increased by connecting additional amplifiers.
- Remote microphone can be used for separate broadcasts (driver waiting room or parking garage).
- In emergencies, DC 24V input shuts down amplifiers.

Compound Building Outline

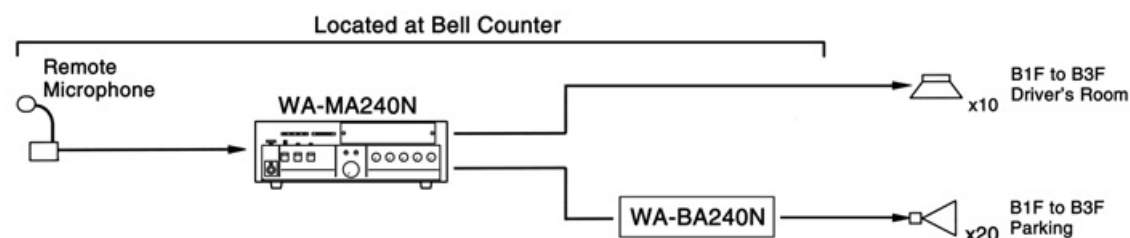


System Diagram

Public Address Paging System for whole facility



Paging System for Parking



KEY POINT

Public Address Paging System

• 2-channel Broadcast

Transmit a message only to the zone that needs it.

• Cascade Connection

Allows added amplifier capacity and additional speaker circuits.

• Simple Emergency Broadcast Announcements

Adding the optional Sound Message Unit to the master unit allows broadcast of emergency instructions and also supports turning off power to local amplifiers.

Paging System for Waiting Room

• Remote-controlled Microphone Connection

Allows remote microphones to be used for individual, group, all-at-once emergency, and simultaneous 2-channel broadcasts.

• Cascade Connection

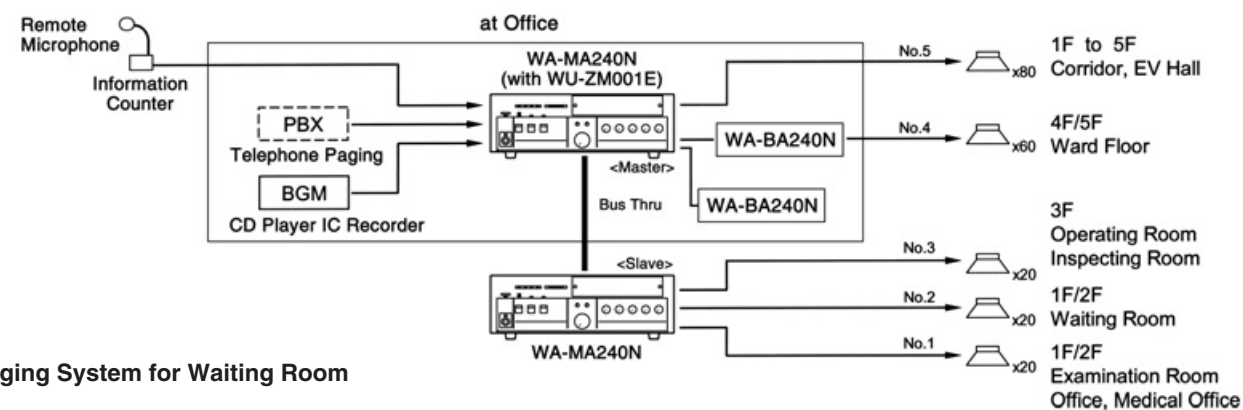
Increases expansion capability to include all-zone broadcast to separate facilities.

FEATURES

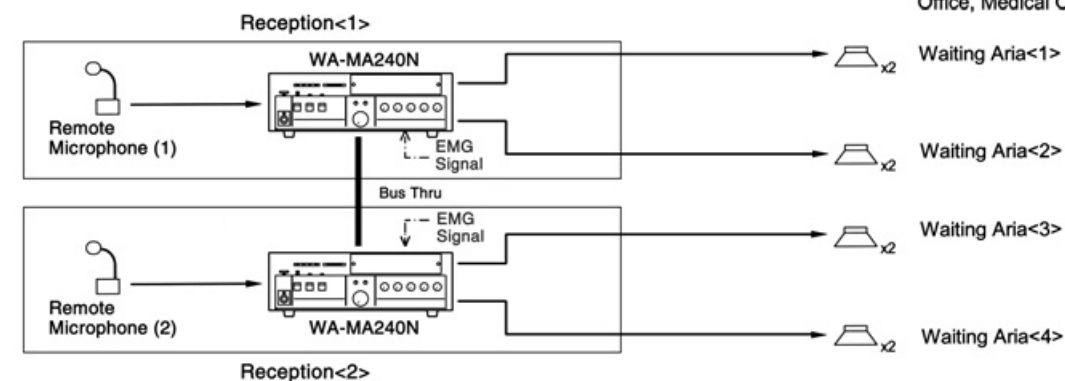
- Background music broadcast to hallways and elevator lobbies.
- Mutes background music when remote microphone is in use.
- Emergency message is broadcast in response to emergency input.
- Paging outpatients waiting to see the doctor by next-in-queue numbers.
- Normal usage (Paging from individual amplifiers)
 - Reception <1> → Waiting Area <1> <2>
 - Reception <2> → Waiting Area <3> <4>
- All zone (Paging from one amplifier)
 - Reception <1> or <2> → Waiting Area <1> <2> <3> <4>

System Diagram

Public Address Paging System



Paging System for Waiting Room



INSTALLATION

AC Voltage Setting

- Before plugging the AC power plug into the mains, make sure the VOLTAGE SELECTOR switch on the back of the Amplifier is in the proper position.
- The factory preset is 220 V to 240 V. The Amplifier will not operate correctly if the VOLTAGE SELECTOR is set to 220 V to 240 V while the AC voltage is 110 V to 120 V.

Backup for AC Power Cut

- Do not use UPS (Uninterruptible Power Supply) as backup in case of AC power cut. Use external batteries instead.

External Battery Precautions

Note the following precautions when using an external battery.

- Make sure the external battery is a 24 V Lead Acid battery (or two 12 V batteries in series connection). Panasonic Corporation holds no responsibility for any Amplifier fault operation or other inconveniences resulting from using any other batteries except that indicated above.
- Use the formula below to determine the battery capacity that is necessary to support the amount of operating time required. Note, however, that the actual amount of operation time provided by a battery varies greatly in accordance with the Amplifier's signal output Level.

$$\text{Battery Capacity [AH]} = \text{Amplifier Normal DC Consumption Current [A]} \times \text{Required Operating Time [H]}$$

* Based on IEC60065 standards. Refer to the SPECIFICATIONS (page 48).

- When connected to an external battery, the Amplifier will automatically switch to the battery power supply once the AC power supply is cut off by turning off the POWER switch or due to power cut. The battery power is not cut off even when the POWER switch on the back of the Amplifier is turned off. The battery power consumption continues even when both the OPERATE and the POWER switches are off and the OPERATE indicator remains lit amber. Use the formula below to determine the battery life.

$$\text{Battery Life [H]} = \text{Battery Capacity [AH]} \div \text{Amplifier Standby DC Consumption Current [A]}^*$$

* Please refer to the SPECIFICATIONS (page 48).

To save the power of the battery, switch off both the POWER and the OPERATE, remove the battery if the Amplifier is not in use for a long period.

- No battery power will be consumed only if the AC power is connected. And the Amplifier has no built-in battery charger. Note that the battery discharges even when it is not in use, so observe the battery's instructions and check the battery periodically. Be sure to remove the battery from the Amplifier before charging. And charge the battery properly according to the instructions of the battery and the battery charger.
- The Amplifier operates normally with the battery voltage over 21 V, and audio output malfunction may occur if the voltage is lower than 21 V.

Cautions:

- Refer all work related to the installation and maintenance of the external battery to qualified service personnel or system installers.
- Be sure to turn off power (AC) before installing or removing a battery. To protect the battery, provide one of the fuses shown below between the battery + terminal and the Amplifier's + terminal.

WA-MA120N: 15 A
WA-MA240N: 30 A

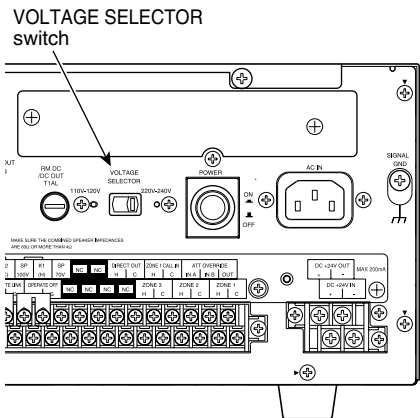
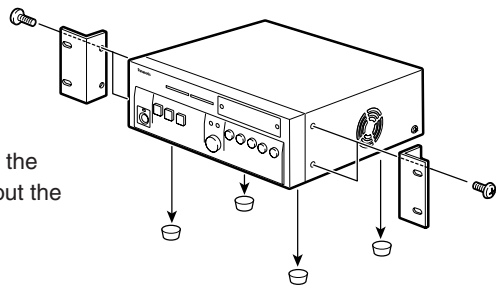
Take care to ensure proper battery polarity and to avoid shorts while working.

Replacing the Fuse

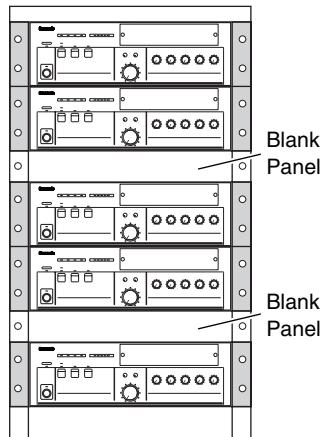
- If the fuse blow, replace it with a fuse that is the same shape and capacity. The wrong type of fuse will be prone to blowing even under normal conditions, and creates the risk of danger if the Amplifier malfunctions.

Installing Rack Mounting Brackets

- Installing the supplied rack mounting brackets lets you configure the Amplifier for rack mounting.
- 1. Remove the screws (M5 x 16) from both sides of the Amplifier.
- 2. Use the four screws (M5 x 16) to attach the rack mounting brackets.
- Also remove the four rubber feet on the bottom of the Amplifier by using a flat blade screwdriver to pry out the pins that hold the feet in place.



Rack Mounting Precautions



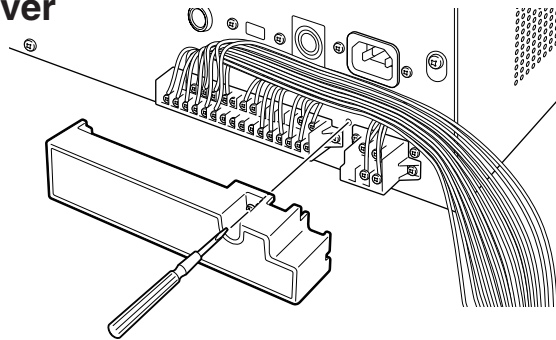
CONNECTIONS

Important:

- The Amplifier's output power cannot be increased if multiple Amplifiers (or WA-BA240N Booster Power Amplifier) are inputting and outputting the same signal "in parallel operation" because it will short circuit. Absolutely do not connect the Amplifiers together in parallel operation, doing so may result in a malfunction.

Removing the Terminal Cover

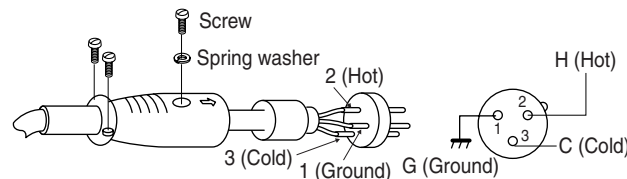
- Loosen the screw that secures the terminal cover.
- Remove the terminal cover.



Cables and Connectors

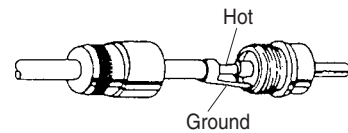
Cable with XLR-3-12 Type (Male) Connector

Use this type of cable to connect to inputs 1 through 3. Use a connector that is wired pin 2 hot.



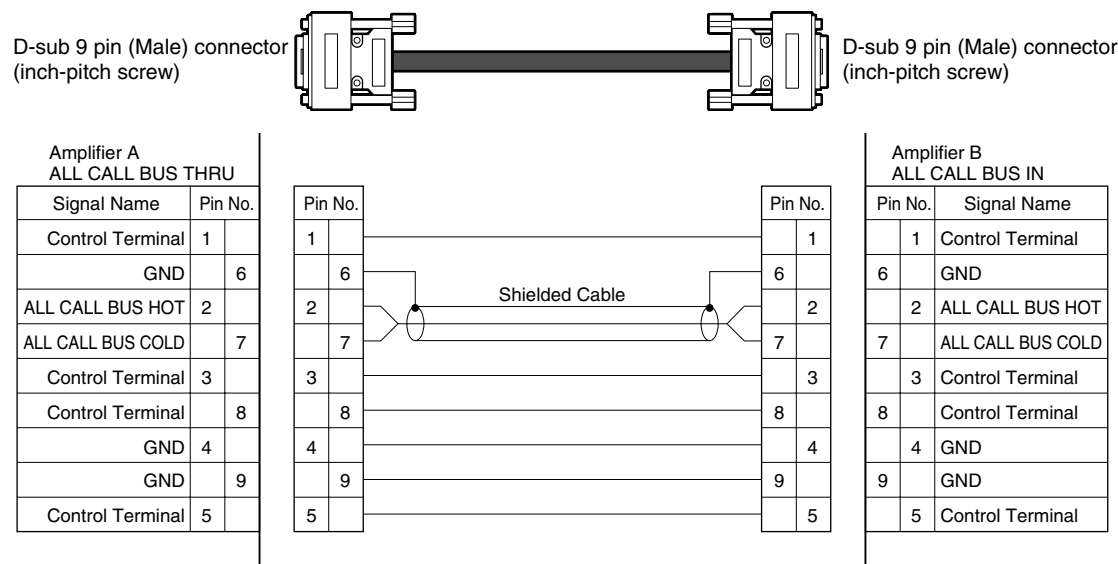
Cable with RCA Pin Plug

Use this type of cable to connect to LINE 1, LINE 2, REC OUT, LINE OUT, INPUT D-OUT, and INS IN/THRU/OUT.

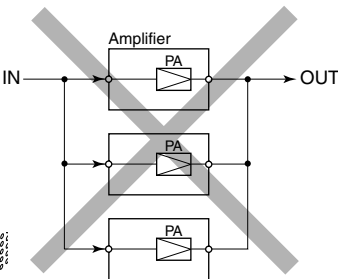


Cable with D-sub 9 pin (Male) Connector on both Ends (inch-pitch screw)

Use this type of cable to link the ALL CALL BUS connectors when connecting multiple Amplifier units together.

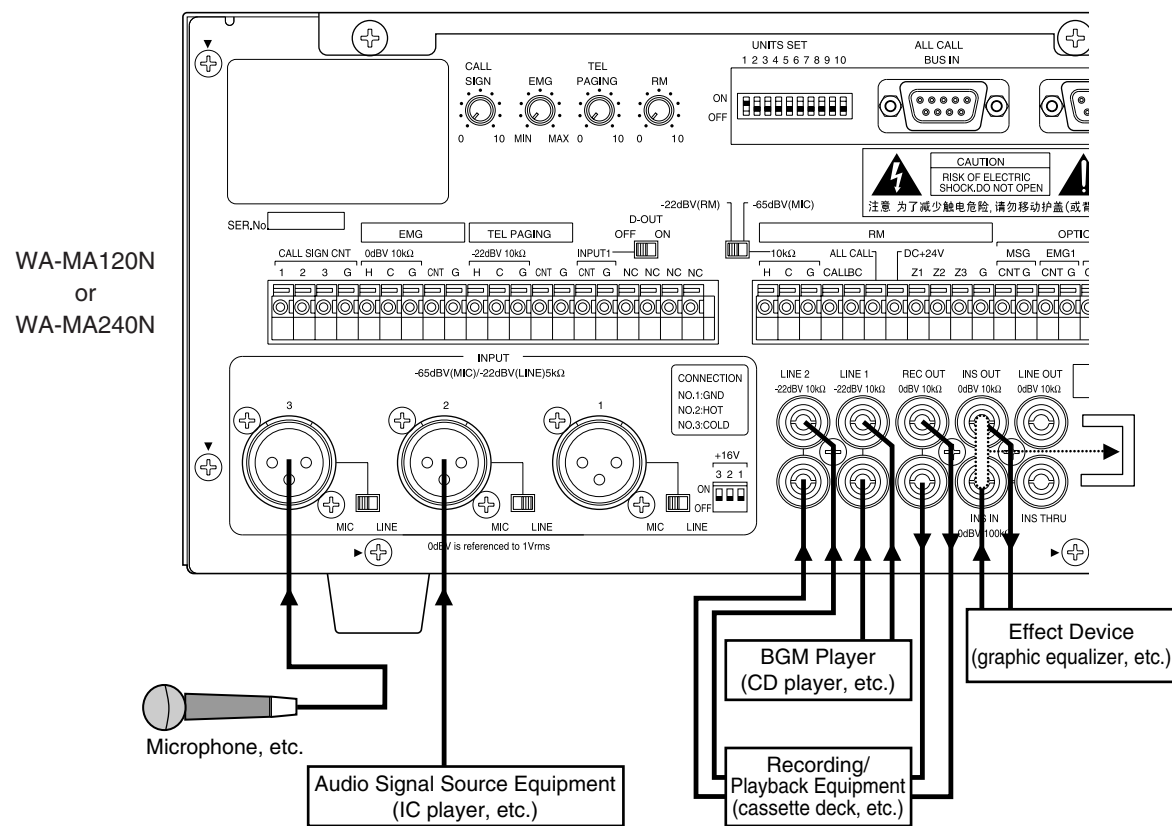


- Use a straight cable with all pins wired. Be sure to use shielded cable only for audio signal connections.
- General RS422 cable can be used for short distances of a few metres.



LINE1,2, INPUT2,3, REC OUT, INS IN/OUT Connections

- Use the connections shown below for a microphone or recording/playback equipment, effect device that is not equipped with activation control (no-voltage make contact).
- For information about connecting INPUT1, refer to page 19.



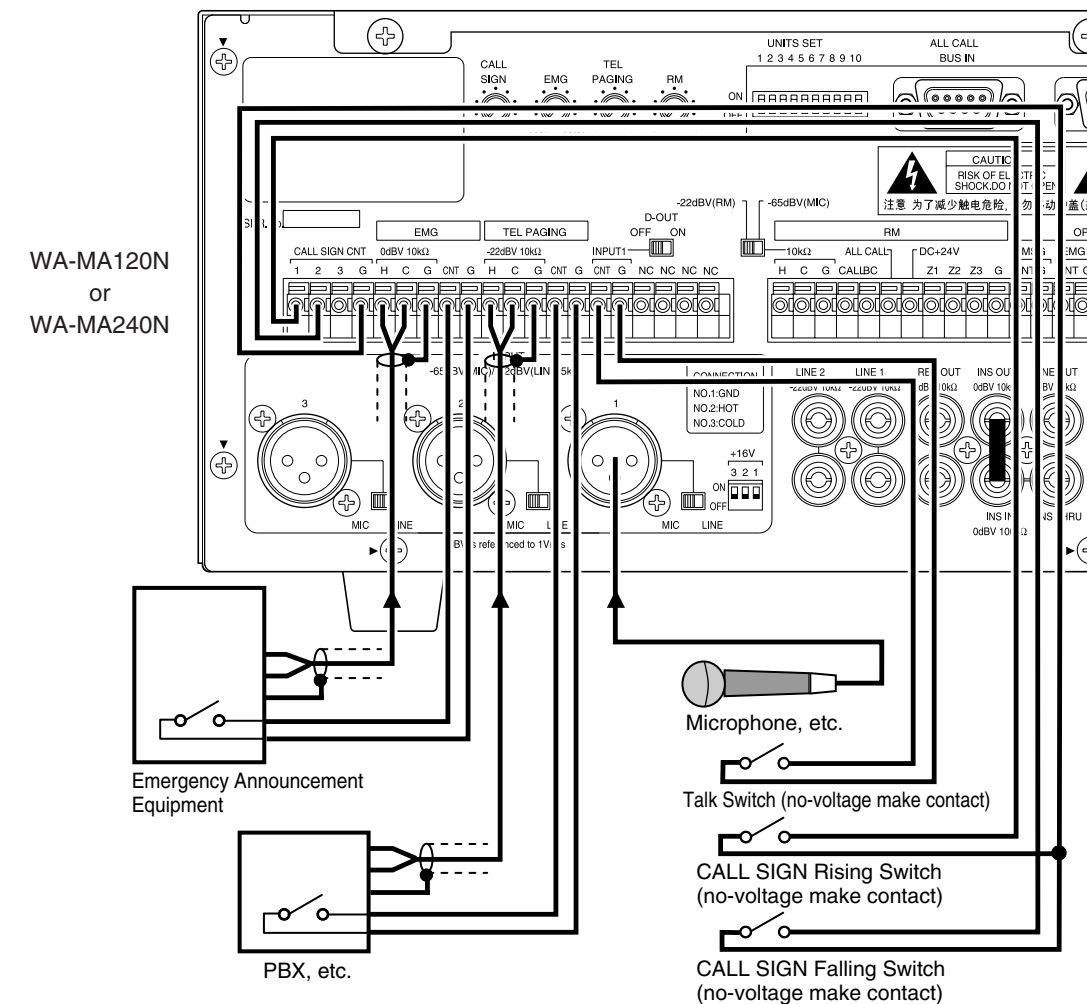
- Change the INPUT1-3 MIC/ LINE switches setting in accordance with the equipment being connected.
- When connecting an effect device, remove the plug inserted in the RCA pin jack.
- Turn the INPUT1-3 +16 V ON/OFF switches on only when using an electret condenser microphone.

Important:

- Leaving this setting on when for any other type of connection will cause malfunction of the connected device or equipment.
- Changing this setting also can cause noise, so be sure to use the INPUT1-3 knobs on the front of the Amplifier to reduce volume before changing this setting.

EMG, TEL PAGING, INPUT1 Connections

- Use the connections shown below for emergency announcement equipment or PBX, microphone that is equipped with activation control (no-voltage make contact).



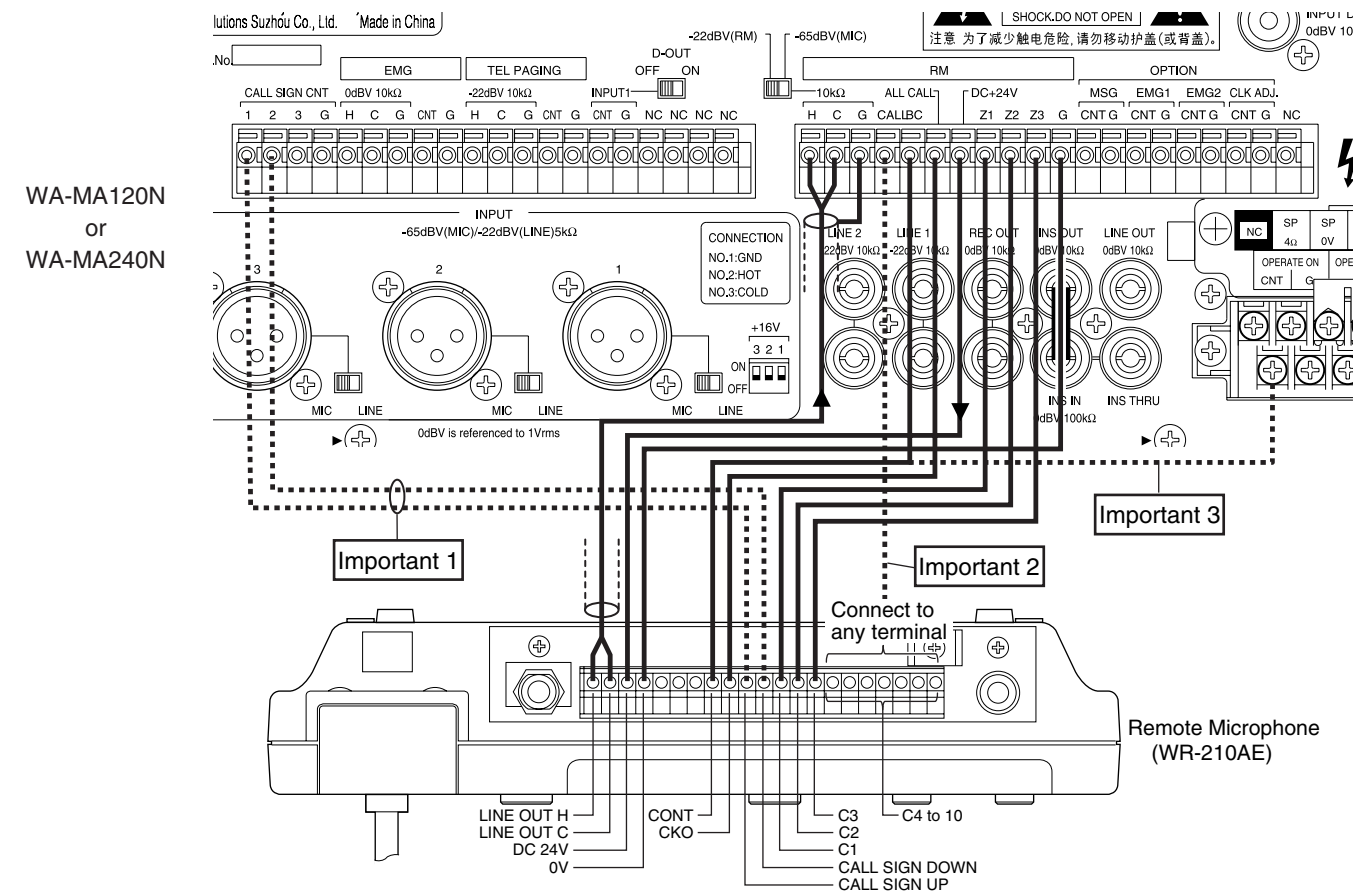
- Change the INPUT1 MIC/ LINE switches setting in accordance with the equipment being connected.
- Turn the INPUT1 D-OUT switch on when the INPUT 1 signal is being output from INPUT D-OUT for 2-channel announcement.
- Be sure to connect the connected device's no-voltage make contact terminal to each activation control terminal [CNT]. If they are not connected, announcement priority control will not work or the audio signal of the equipment will not be output.
- When using a call tone, be sure to make contact with each input equipment's not-voltage make contact and then activate the call tone. The call tone will not be announced if it is activated first.
- Turn the INPUT1 +16 V ON/OFF switch on only when using an electret condenser microphone.

Important:

- Leaving this setting on when for any other type of connection will cause malfunction of the connected device or equipment.
- Changing this setting also can cause noise, so be sure to use the INPUT1 knob on the front of the Amplifier to reduce volume before changing this setting.

Remote Microphone (WR-210AE) Connection

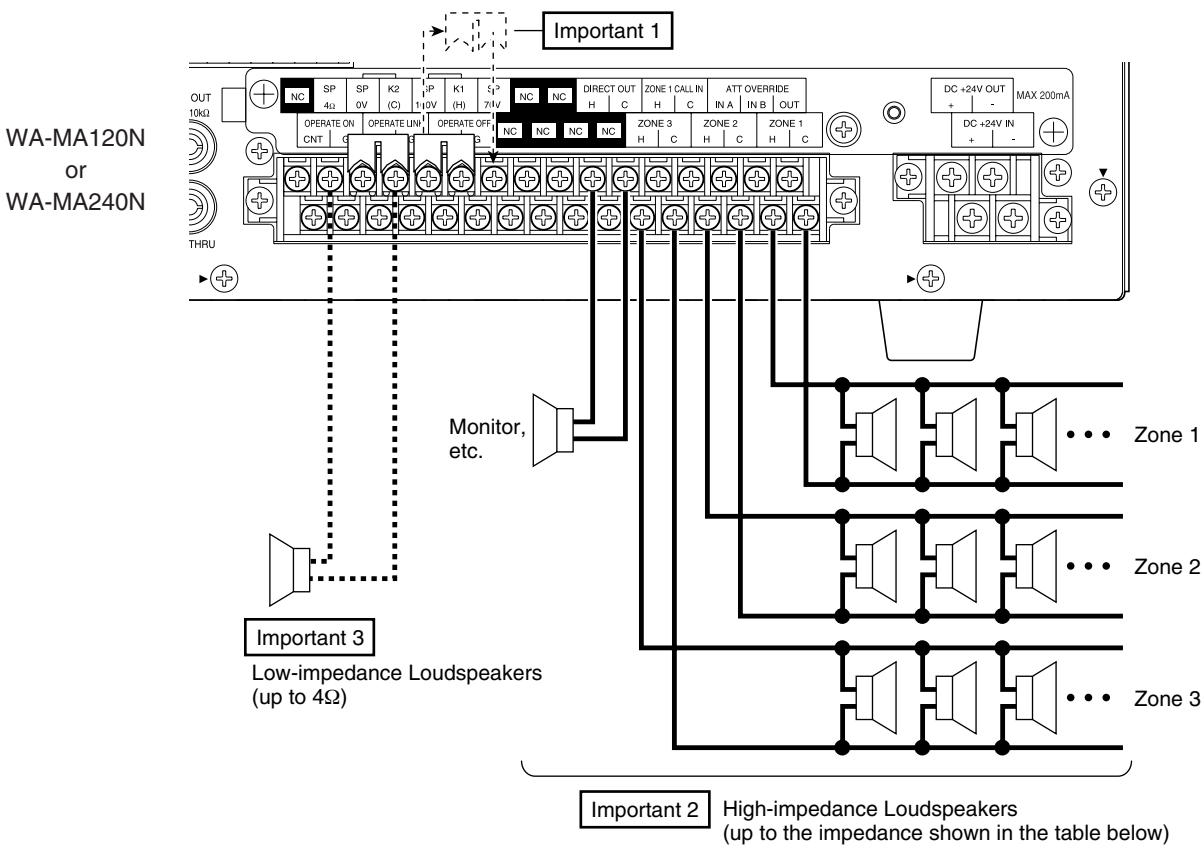
- Up to four Remote Microphone units can be connected. For multiple connections, priority connection between Remote Microphones is required. For more information, consult the operating instructions of the Remote Microphone.



- Confirm that the -22dBV (RM), -65dBV (MIC) switch is set to -22dBV (RM). If it isn't change the switch setting to -22dBV (RM).
- Important 1:**
Make this connection if you want to use call tones.
- Important 2:**
To perform 2-channel announcement from the Remote Microphone, connect the CALL terminal to any one of the C4 to C10 terminals of the Remote Microphone. The individual switch (4-10) on the Remote Microphone that corresponds to the terminal number you connect to can be used to switch to zone 1 interrupt during 2-channel announcement.
- Important 3:**
If you want the Amplifier to enter the operation mode when activation control is imposed from the Remote Microphone, branch from the cable connected to the Remote Microphone's CONT terminal and connect to the Amplifier's OPERATE ON terminal.

Speaker Connection

- Use the connections shown below for connecting high-impedance or low-impedance loudspeakers.
- Caution:**
High-impedance and low-impedance loudspeakers cannot be connected at the same time. When using high-impedance loudspeakers, use either 100 V or 70 V.

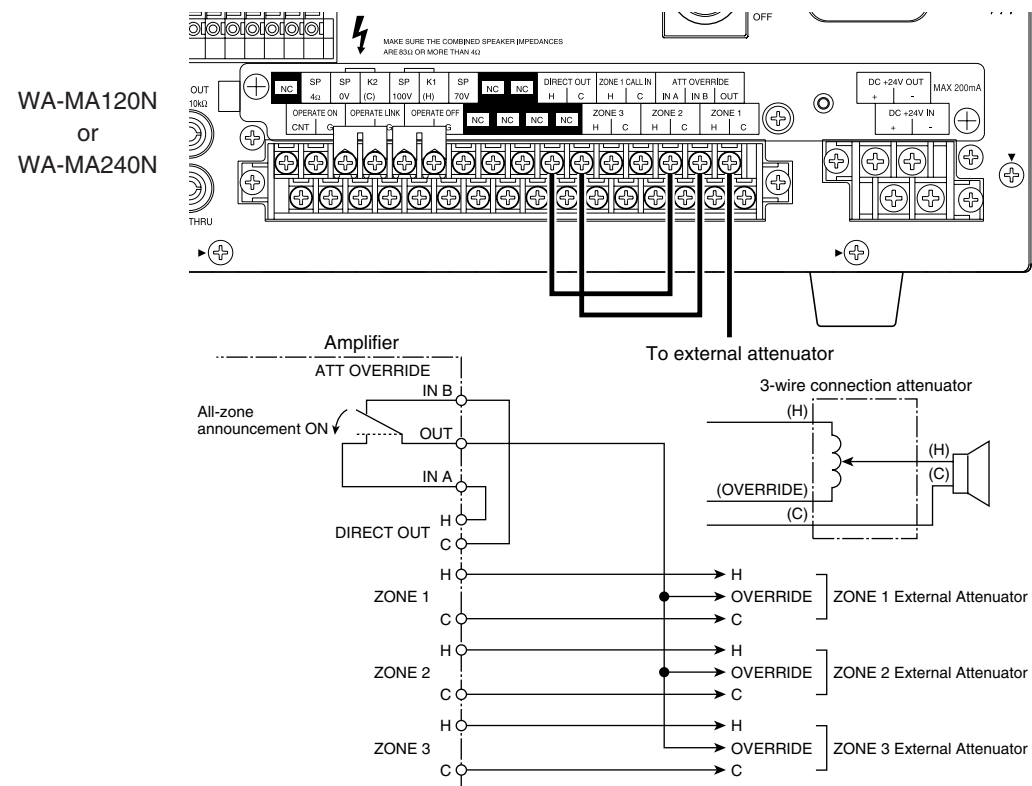
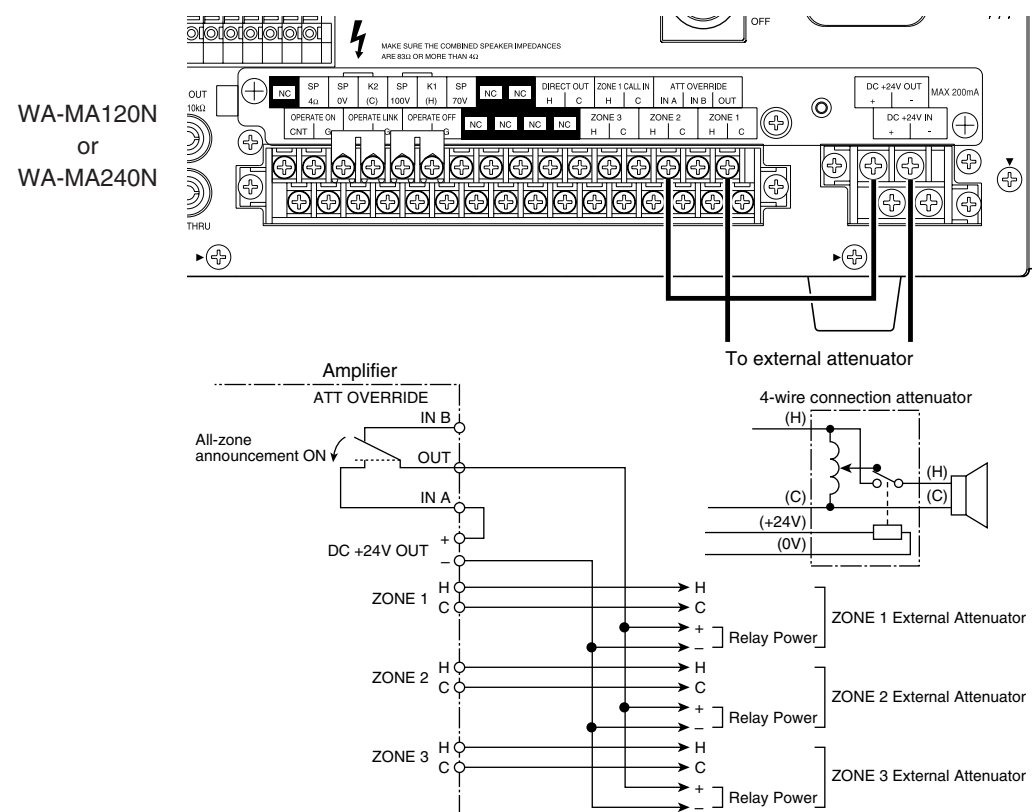


- Important 1:**
When you want high-impedance loudspeaker output to by 70 V, change the position of the jumper as shown in the illustration. The factory preset is 100 V.
- Important 2:**
Make sure that the parallel composition impedance of high-impedance loudspeakers does not fall below the values shown in the table below.

Speaker Connection Method	Conditions	Minimum Composition Impedance			
		WA-MA120N		WA-MA240N	
		100 V	70 V	100 V	70 V
Speakers connected to ZONE 1 or DIRECT OUT only	Composition impedance for one zone	83 Ω (120 W)	42 Ω (120 W)	42 Ω (240 W)	21 Ω (240 W)
Speakers connected to multiple zones and DIRECT OUT, and use simultaneously	Composition impedance of all zones	83 Ω (120 W)	42 Ω (120 W)	42 Ω (240 W)	21 Ω (240 W)

- Important 3:**
Make sure that the parallel composition impedance of low-impedance loudspeakers does not fall below 4 Ω. Up to two 8 Ω speakers or four 16 Ω speakers can be connected in parallel.

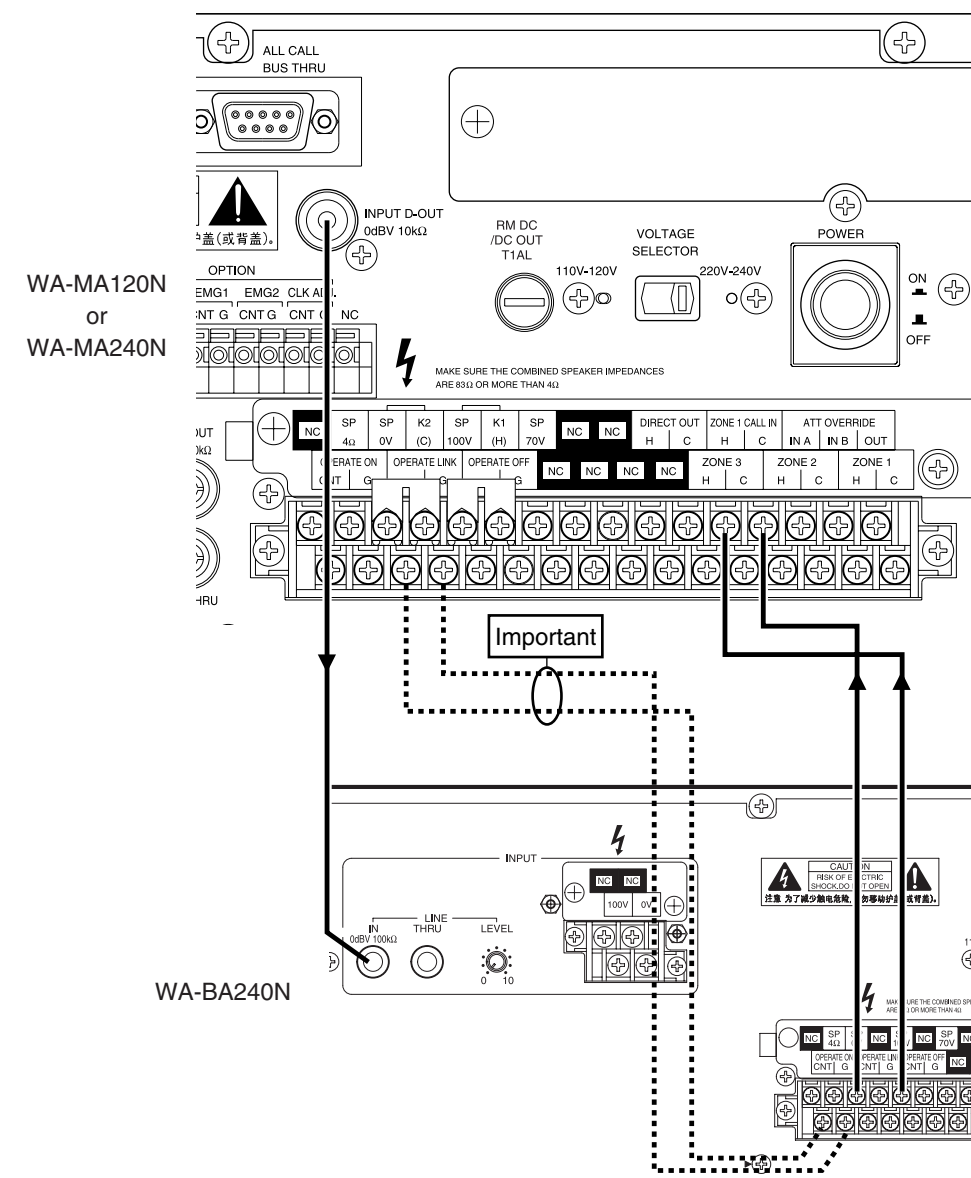
WA-MA120N/WA-MA240N

Connecting to Override External Attenuation during All-zone Announcement
(Using 3-wire connection)Connecting to Override External Attenuation during All-zone Announcement
(Using 4-wire connection)

WA-MA120N/WA-MA240N

2-channel Broadcast Announcement Connection

- For 2-channel broadcast announcement, connect the WA-BA240N as shown below.



- Use the gold plated plug (accessories of WA-BA240N) when connecting to LINE IN of WA-BA240N.
- Set the 2-channel announcement volume using the LEVEL knob of WA-BA240N.

Important:

If you want the WA-BA240N to turn on together with the WA-MA120N or WA-MA240N, connect the OPERATE LINK terminal to the OPERATE ON terminal of the WA-BA240N.

Note:

If other amplifiers except WA-BA240N are required, select appropriate power amplifier rated output in accordance with ZONE1 speaker impedance.

Battery Connection

- Make sure the external battery is a 24 V Lead Acid battery (or two 12 V batteries in series connection). Panasonic Corporation holds no responsibility for any Amplifier fault operation or other inconveniences resulting from using any other batteries except that indicated above.
- Use the formula below to determine the battery capacity that is necessary to support the amount of operating time required. Note, however, that the actual amount of operation time provided by a battery varies greatly in accordance with the Amplifier's signal output level.

Battery Capacity [AH] = Amplifier Normal DC Consumption Current [A] * x Required Operating Time [H]

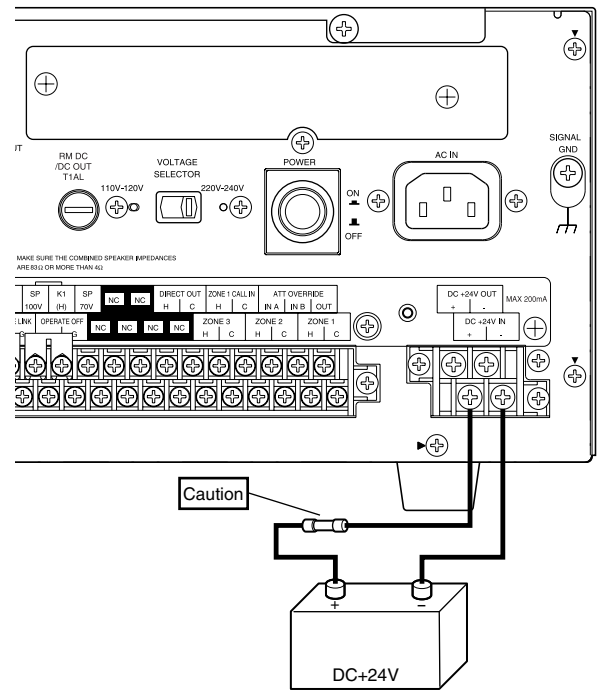
* Based on IEC60065 standards. Refer to SPECIFICATIONS (page 48).

Caution:
Be sure to turn off power (AC) before installing or removing a battery. To protect the battery, provide one of the fuses shown below between the battery + terminal and the Amplifier's + terminal.

WA-MA120N: 15 A

WA-MA240N: 30 A

Take care to ensure proper battery polarity and to avoid shorts while working.



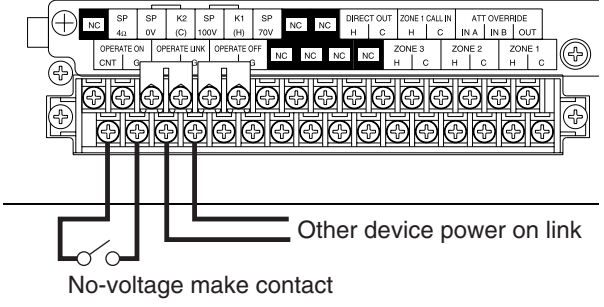
Operation On/Off Control

• Operation On Control and Operation Link Control

The Amplifier can be put into the operation mode externally by no-voltage make contact. The Amplifier can also cause other linked equipment to enter operation mode when it enters the operation mode.

Important:

- In order for external operation control to be performed, the POWER switch on the back of the Amplifier must be ON, and the OPERATE switch on the front must be OFF so the Amplifier is in the non-operation (standby) mode. The Amplifier's current operation/non-operation mode is determined by the relationship between external control (no-voltage make contact) status and the Amplifier's OPERATE switch setting.



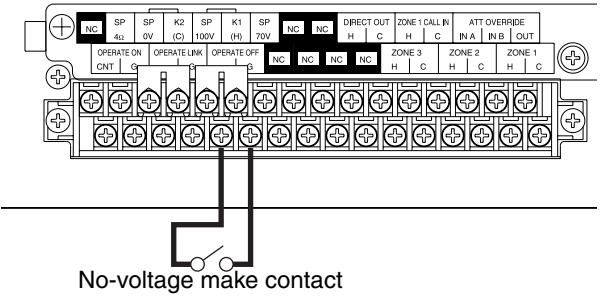
Amplifier's OPERATE switch position	No-voltage make contact	
	Make	Break
Not Depressed (OFF)	Operation Mode	Non-operation Mode
Depressed (ON)	Operation Mode	Operation Mode

• Operation Off Control

The Amplifier can be put into the non-operation (standby) mode externally by no-voltage make contact. Use this capability when you want to terminate business announcements from this Amplifier during announcements from external emergency announcement equipment.

Important:

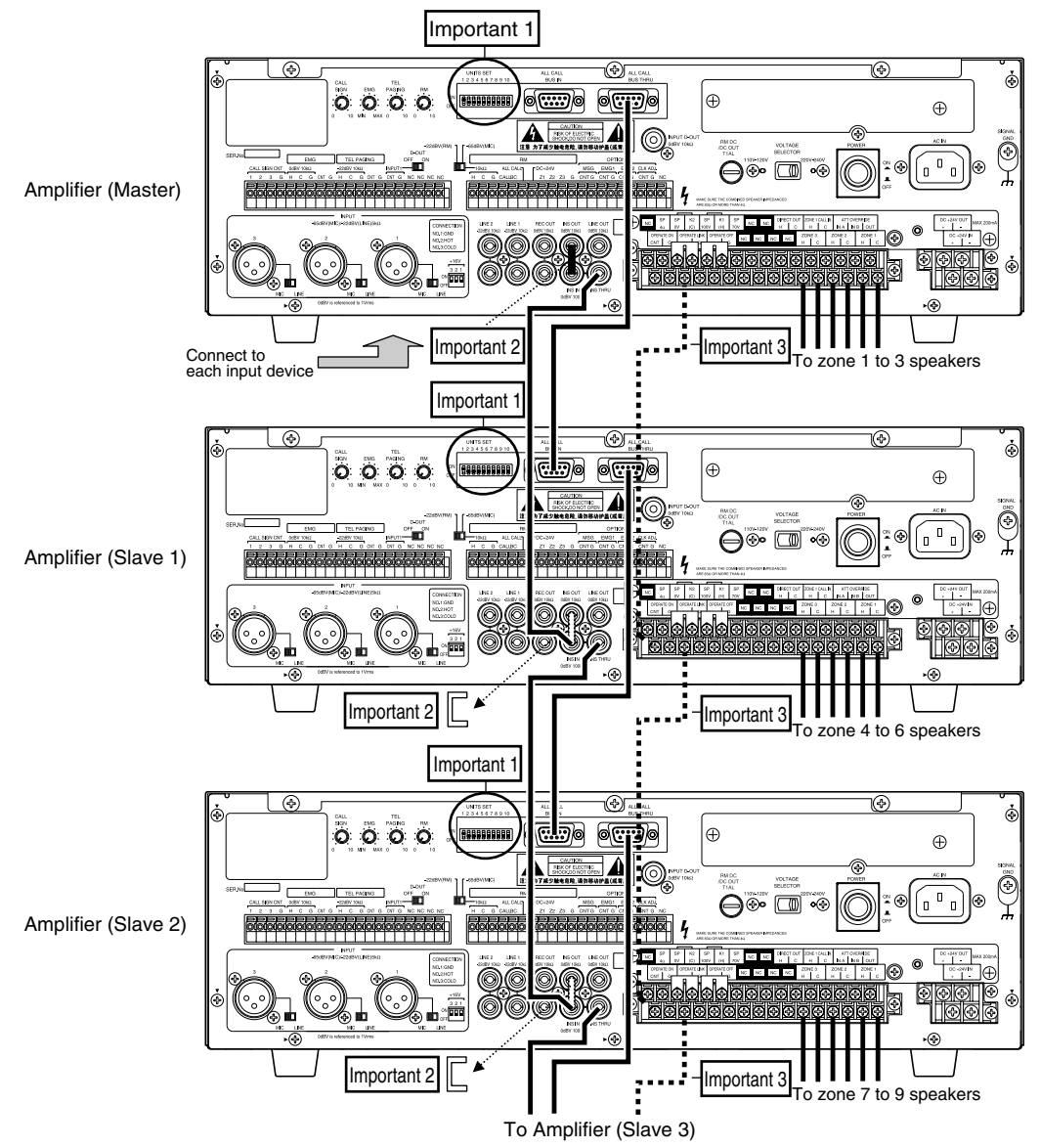
- In order for operation off control to be performed, the POWER switch on the back of the Amplifier must be on, and the OPERATE switch on the front must be ON so the Amplifier is in the operation mode. The Amplifier's current operation/non-operation mode is determined by the relationship between external control (no-voltage make contact) status and the Amplifier's OPERATE switch setting.



Amplifier's OPERATE switch position	No-voltage make contact	
	Make	Break
Not Depressed (OFF)	Non-operation Mode	Non-operation Mode
Depressed (ON)	Non-operation Mode	Operation Mode

Zone Expansion Connection

- You can expand the number of zones using multiple Amplifier units.
- The illustration below shows the concept behind zone expansion. When connected this way the master Amplifier uses all circuits but additional Amplifiers (Slave 1, 2 etc.) only use the built-in power amplifiers and zone output. This provides the maximum rated output of the Amplifier for each group of three zones.
- The maximum number of Amplifiers (including the master and slaves) is 10, which means there can be to 30 zones.



- All connect the ALL CALL BUS connectors as shown in the illustration. All-zone announcement will not be possible if these connectors are not connected.

Important 1:

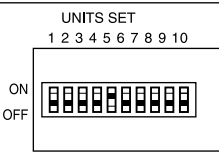
On all of the Amplifiers, set the UNITS SET switches to the total number of Amplifiers.
Example: In the case there is one master and four slaves, set the UNITS SET switches of all of the Amplifiers to 5.

Important 2:

Never remove the plug from the RCA pin jack of the master Amplifier. No sound will be output in any of the zones if you do. For all of the slave units, remove the plug and then do the connections.

Important 3:

Connect when you want operation control activated on all of the Amplifiers. For the connection shown in the illustration here, entering the operation mode on the master also puts all of the slaves into the operation mode as well. Note, however, that the slaves must be in the standby mode before the master goes into the operation mode.
For information about operation on/off control, see page 24.



CONCEPT

SYSTEM EXAMPLES

CONNECTIONS

PRODUCTS

BLOCK DIAGRAMS

CONCEPT

SYSTEM EXAMPLES

CONNECTIONS

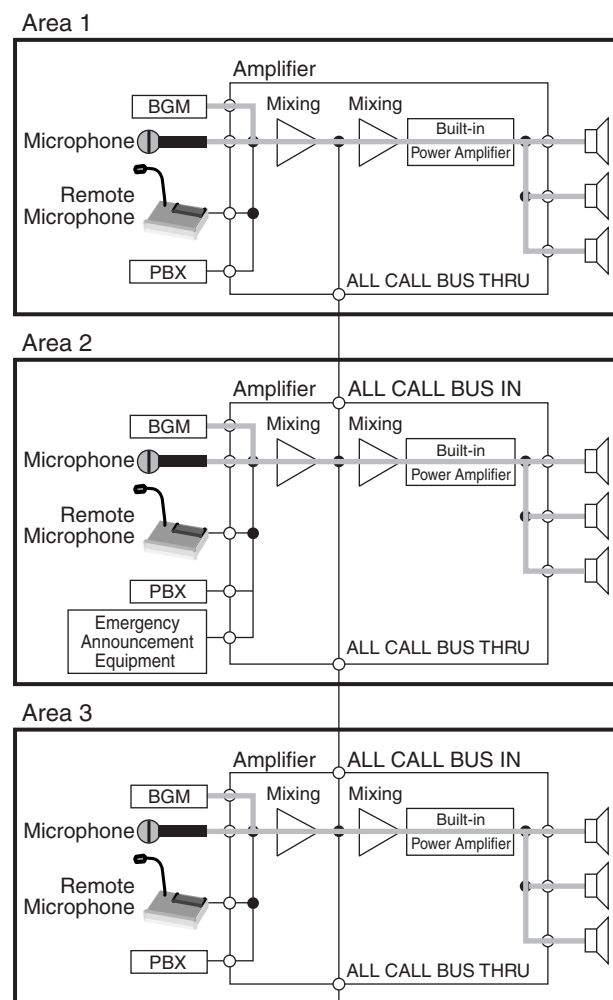
PRODUCTS

BLOCK DIAGRAMS

Inter-area All-zone Announcement Connection

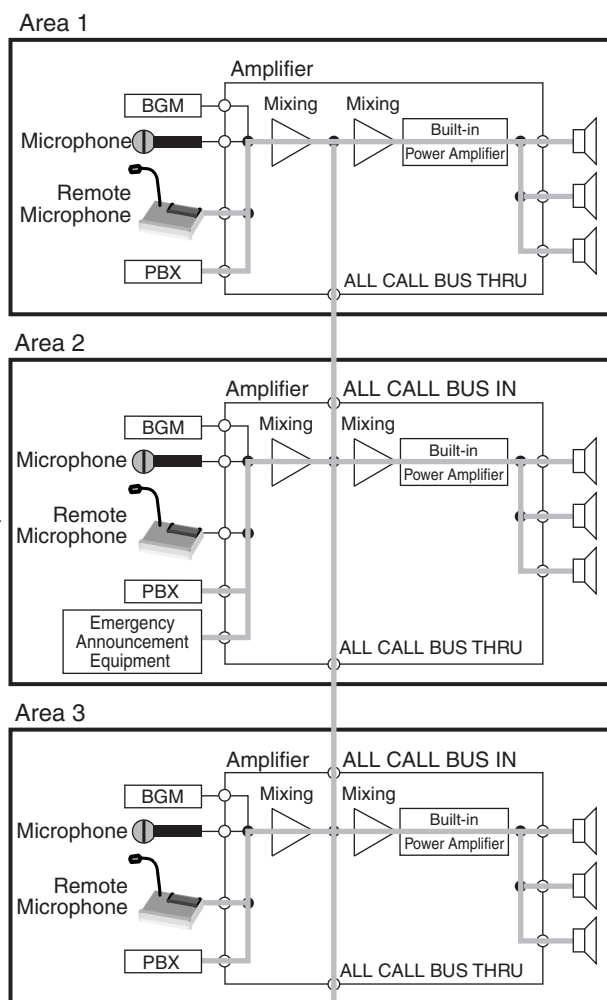
- When Amplifiers are being used for separate operation in multiple areas, they can be connected using the ALL CALL BUS to allow all-zone announcement from one area to all of the other areas.
- The signal paths of an inter-area all-zone announcement during normal operation are shown below. In addition, each input device that is capable of all-zone announcement has a priority level within the same area and between different areas. During an emergency announcement from the emergency announcement equipment in Area 2 of the illustration below, for example, all-zone announcement from any PBX or Remote Microphone from areas 1 through 3 is disabled. When two devices have the same priority, their input is mixed and announced to all zones. In the illustration below, for example, two PBX or two Remote Microphones can be used to announce from different areas to all zones.
- Inter-area all-zone announcement can be configured for up to 10 Amplifiers and 10 areas.

Normal operation from individual zone announcement device (BGM, non-priority microphone)

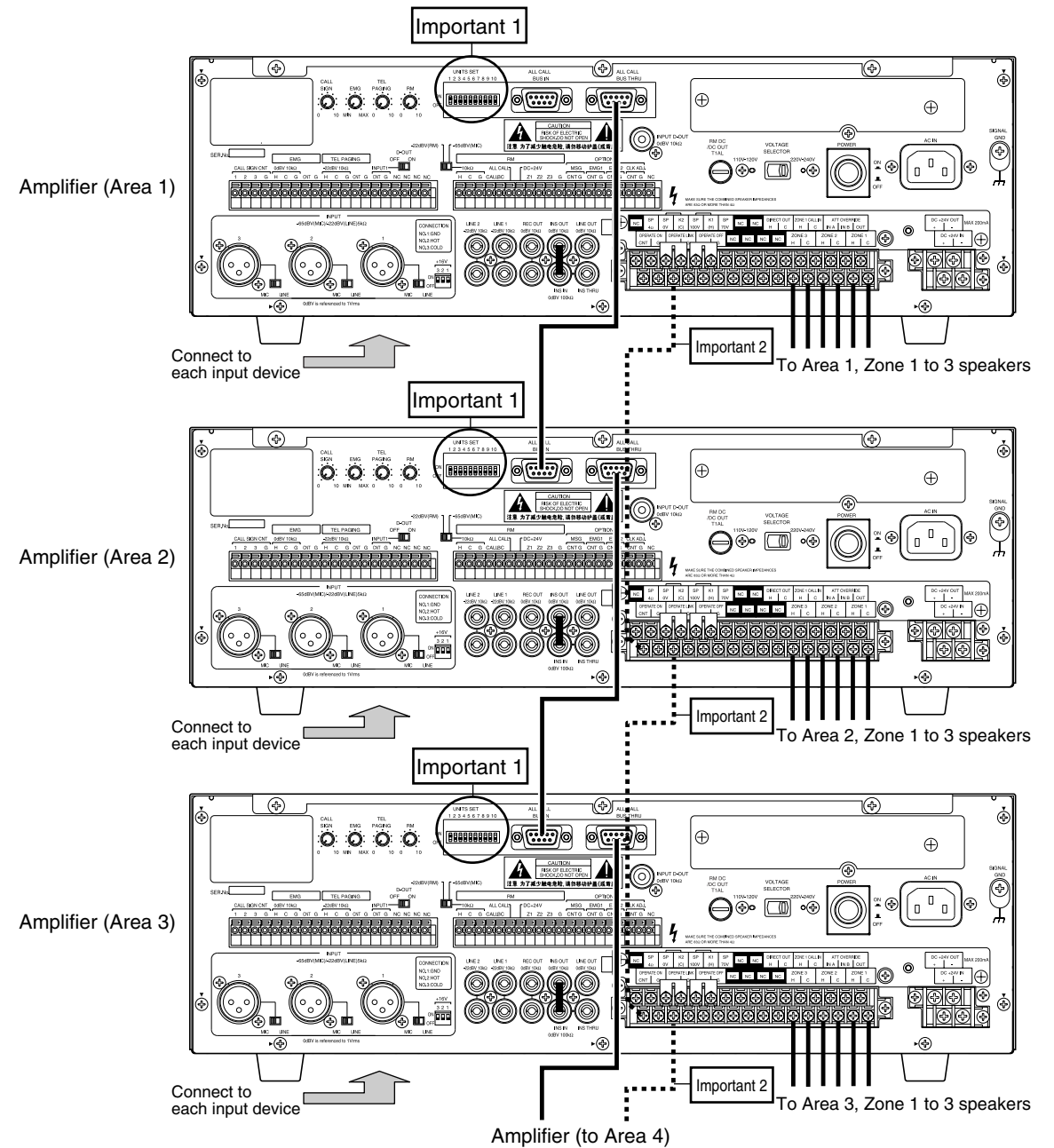


Up to 10 Amplifiers, 10 areas

Inter-area all-zone announcement from all-zone announcement device (priority microphone and remote control microphone, PBX, non-priority announcement device)



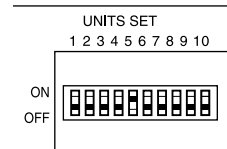
Up to 10 Amplifiers, 10 areas



Important 1:

On all of the Amplifiers, set the UNITS SET switches to the total number of Amplifiers.

Example: In the case there is one master and four slaves, set the UNITS SET switches of all of the Amplifiers to 5.



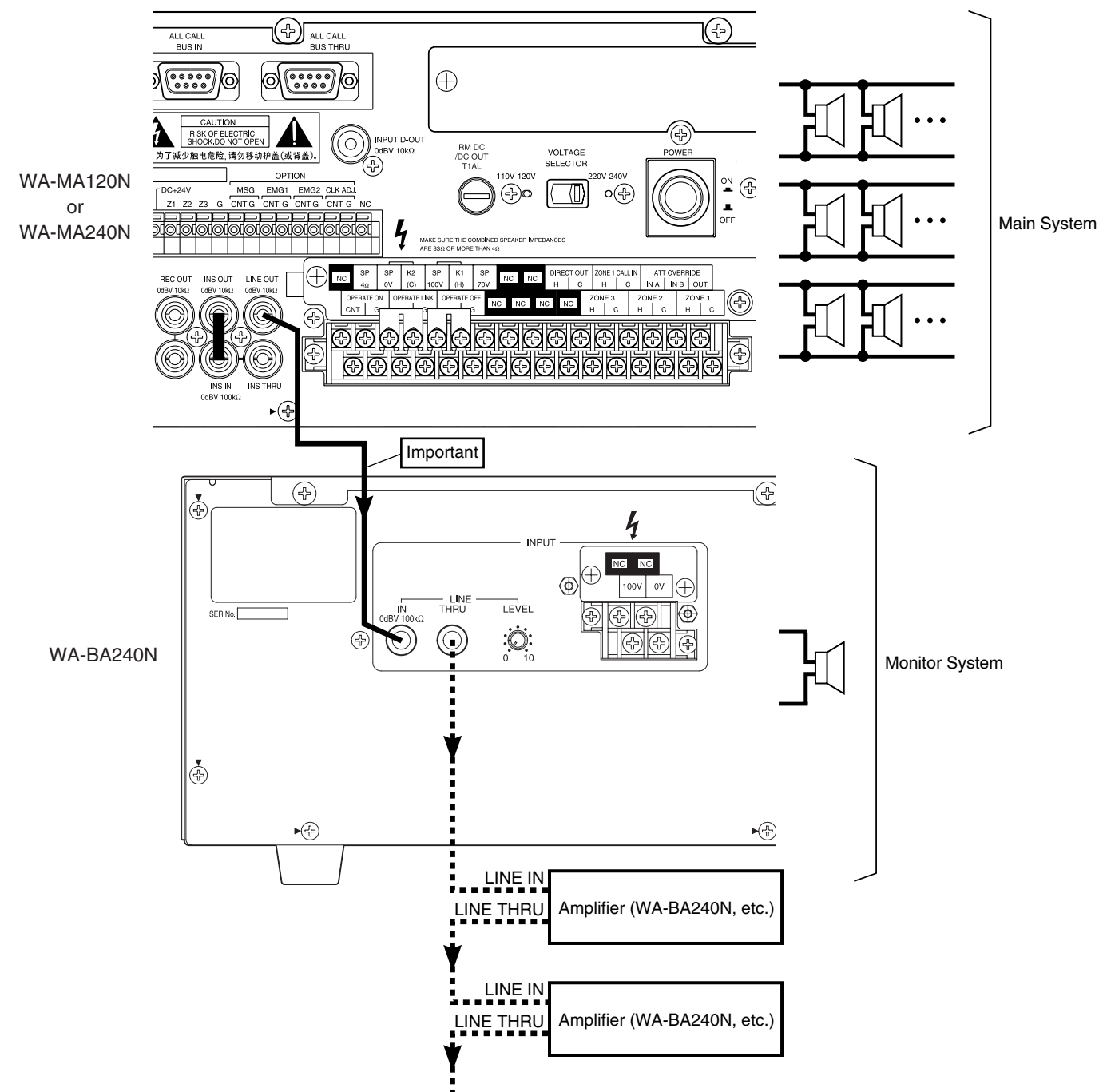
Important 2:

Connect when you want operation control activated on all of the Amplifiers. For the connection shown in the illustration here, entering the operation mode on the master also puts all of the slaves into the operation mode as well. Note, however, that the slaves must be in the standby mode before the master goes into the operation mode.

For information about operation on/off control, see page 24.

Line-level Equipment Connection

- Connect external devices (e.g. pre-amplifiers) to the LINE IN jack. The following illustration is a connection example with the Mixing Power Amplifier (WA-MA120N or WA-MA240N).
- Be sure to use the gold plated plugs (accessories) when using the LINE IN jack and/or the LINE THRU jack.



- Refer to the Operating Instructions of WA-MA120N or WA-MA240N for input and output connection in the Main System. And refer to the next page for method of connecting loudspeakers in the Monitor System.
- Connect the LINE THRU when you want the output of the equipment connected to the LINE IN jack to be input to other equipment as well.

Important:

The LINE THRU jack connects directly without going through the LINE IN jack's internal circuitry.

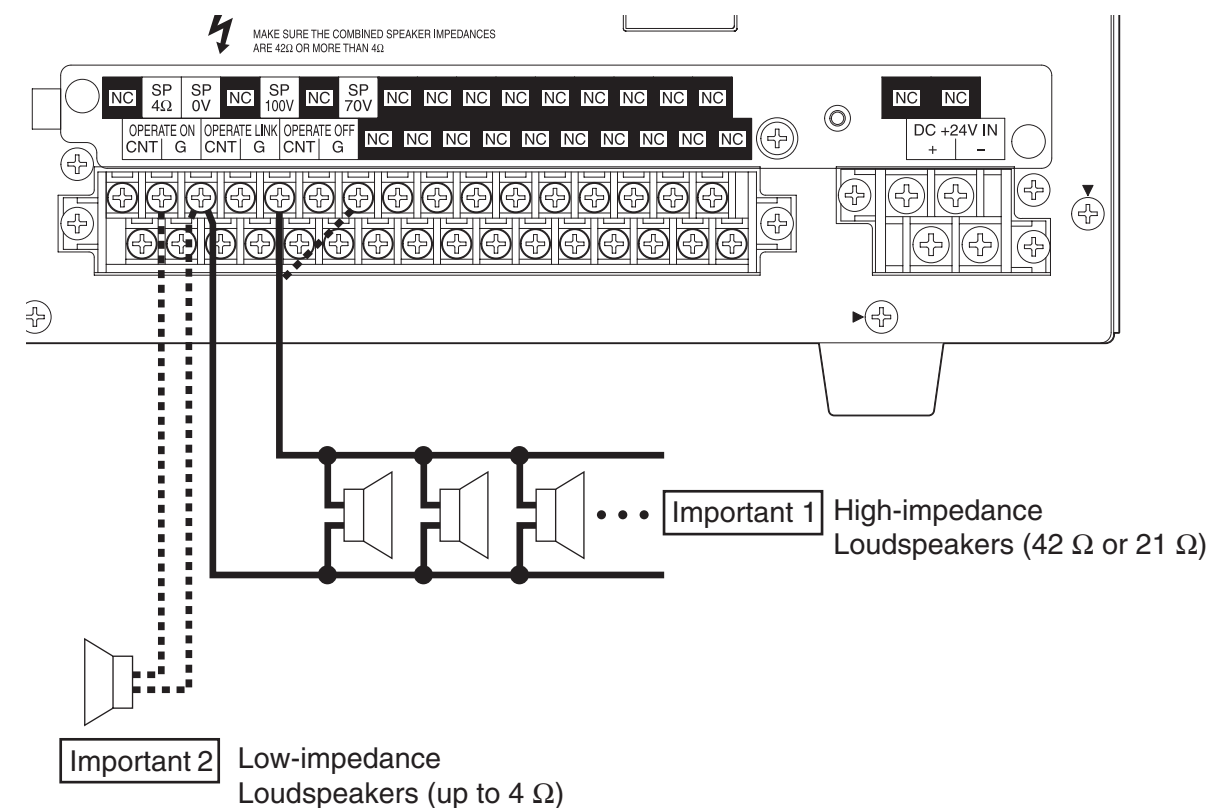
Consequently, the load from the viewpoint of the line-level equipment is the parallel composition value of the Amplifier's input impedance (100 k Ω) and the input impedance of the equipment connected after the LINE THRU jack. Ensure that the input impedance parallel composition value is not less than the matching load impedance of the line equipment.

Speaker Connection

- Use the connections shown below for connecting high-impedance or low-impedance loudspeakers.

Caution:

High-impedance and low-impedance loudspeakers cannot be connected at the same time. When using high-impedance loudspeakers, use either 100 V or 70 V.



Important 1:

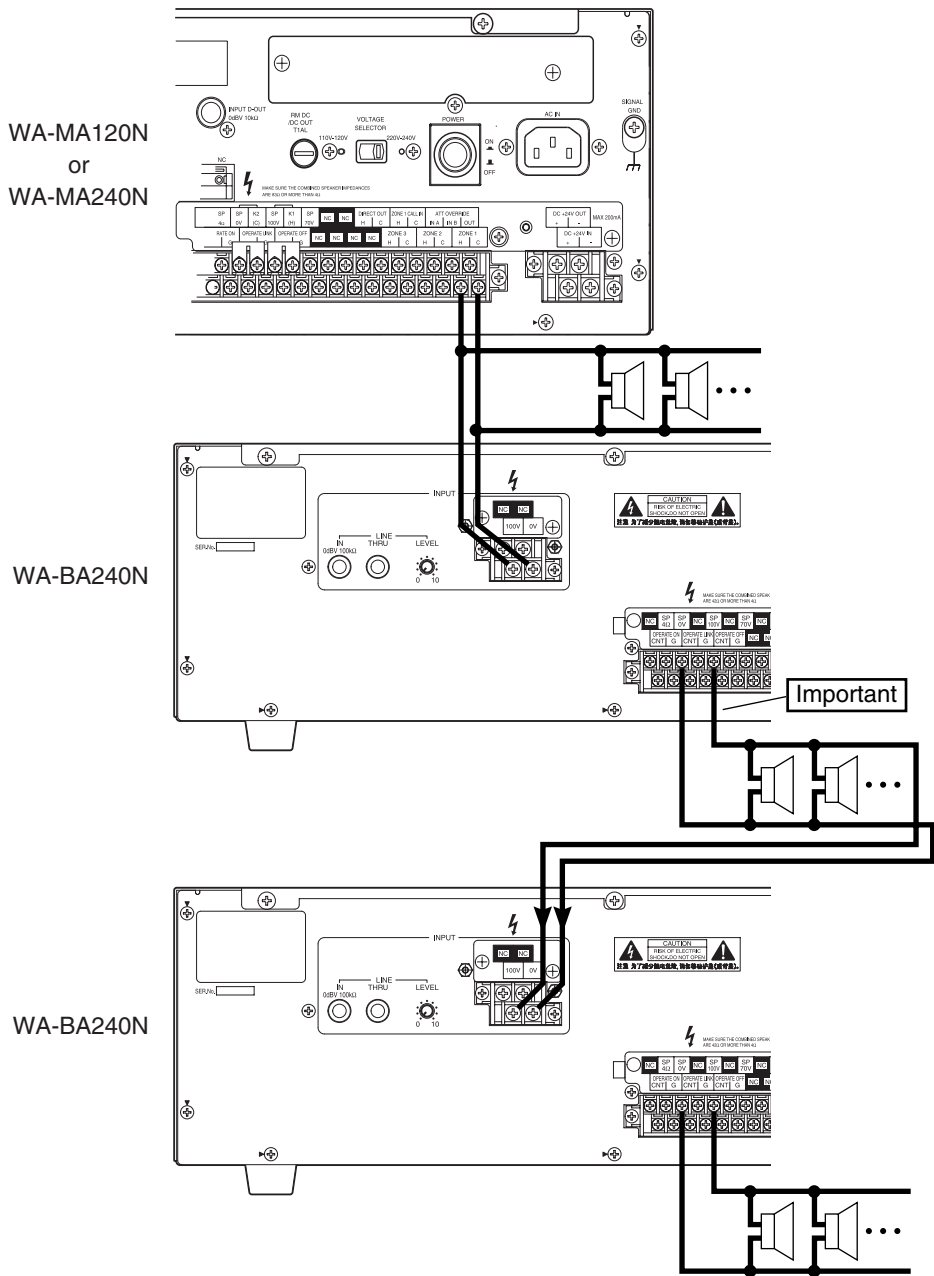
Make sure that the parallel composition impedance of the high-impedance loudspeakers does not become less than $42\ \Omega$ in the case of 100 V, or less than $21\ \Omega$ in the case of 70 V.

Important 2:

Make sure that the parallel composition impedance of low-impedance loudspeakers does not fall below $4\ \Omega$. Up to two $8\ \Omega$ speakers or four $16\ \Omega$ speakers can be connected in parallel.

100 V Input Connection

- Connecting power amplifier output for high-impedance loudspeakers as shown below makes it possible to expand the number of speakers through the Amplifier.
- The following illustration is a connection example with the Mixing Power Amplifier (WA-MA120N or WA-MA240N).



- ZONE 2, ZONE 3 or DIRECT OUT terminals are also available for output of WA-MA120N or WA-MA240N.
- To perform operation link control, interconnect the OPERATE ON/LINK/OFF terminals of the various devices. For information about operation on/off control, see page 31.
- Use amplifiers that support high-impedance loudspeakers when using amplifiers except WA-MA120N or WA-MA240N.

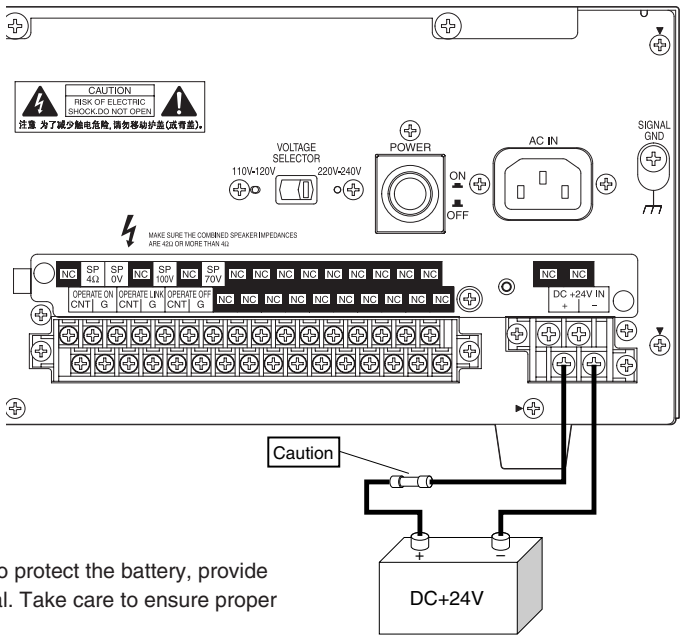
Important:
When the rated output of the power amplifier connected to the Amplifier's 100 V terminal is less than 100 V, the output of the Amplifier will be lower than the rated output.

Battery Connection

- Make sure the external battery is a 24 V Lead Acid battery (or two 12 V batteries in series connection). Panasonic Corporation holds no responsibility for any Amplifier fault operation or other inconveniences resulting from using any other batteries except that indicated above.
- Use the formula below to determine the battery capacity that is necessary to support the amount of operating time required. Note, however, that the actual amount of operation time provided by a battery varies greatly in accordance with the Amplifier's signal output level.

Battery Capacity [AH] = Amplifier Normal DC Consumption Current [A]* x Required Operating Time [H]
* Based on IEC60065 standards. Refer to SPECIFICATIONS (page 53).

Caution:
Be sure to turn off power (AC) before installing or removing a battery. To protect the battery, provide a 30 A fuse between the battery + terminal and the Amplifier's + terminal. Take care to ensure proper battery polarity and to avoid shorts while working.

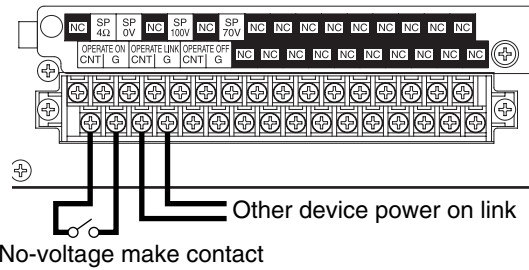


Operation On/Off Control

• Operation On Control and Operation Link Control

The Amplifier can be put into the operation mode externally by no-voltage make contact. The Amplifier can also cause other linked equipment to enter operation mode when it enters the operation mode.

Important:
In order for external operation control to be performed, the POWER switch on the back of the Amplifier must be on, and the OPERATE switch on the front must be OFF so the Amplifier is in the non-operation (standby) mode. The Amplifier's current operation/non-operation mode is determined by the relationship between external control (no-voltage make contact) status and the Amplifier's OPERATE switch setting.

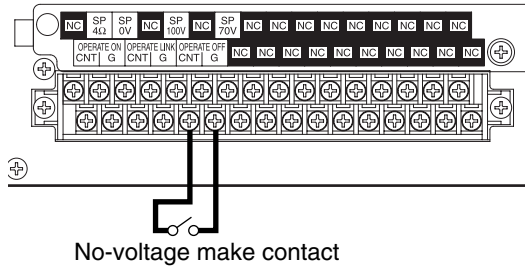


Amplifier's OPERATE switch position	No-voltage make contact	
	Make	Break
Not Depressed (OFF)	Operation Mode	Non-operation Mode
Depressed (ON)	Operation Mode	Operation Mode

• Operation Off Control

The Amplifier can be put into the non-operation (standby) mode externally by no-voltage make contact.

Important:
In order for operation off control to be performed, the POWER switch on the back of the Amplifier must be on, and the OPERATE switch on the front must be ON so the Amplifier is in the operation mode. The Amplifier's current operation/non-operation mode is determined by the relationship between external control (no-voltage make contract) status and the Amplifier's OPERATE switch setting.



Amplifier's OPERATE switch position	No-voltage make contact	
	Make	Break
Not Depressed (OFF)	Non-operation Mode	Non-operation Mode
Depressed (ON)	Non-operation Mode	Operation Mode

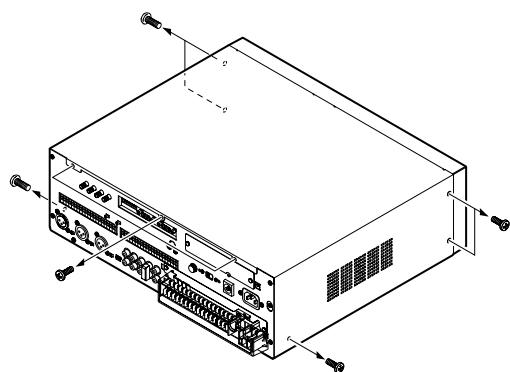
CONNECTIONS AND SETTINGS

Warning:

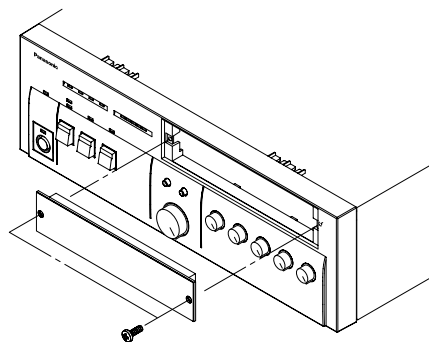
- Be sure to turn off power before connecting or configuring settings.
- Be sure to turn off the device supplying power to the Sound Message Unit.
- Leaving power supplied creates the risk of electric shock and damage to equipment.

■ Installing the Sound Message Unit to the mixing power amplifier and configuring connections

1. Remove the top cover of the mixing power amplifier (Amplifier).

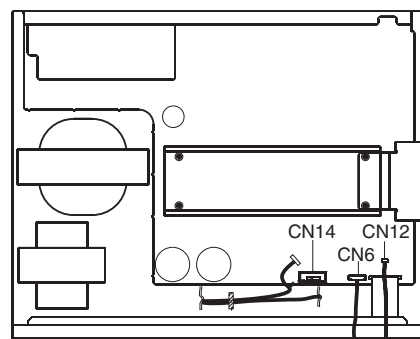


2. Remove the front blank panel from the Amplifier.



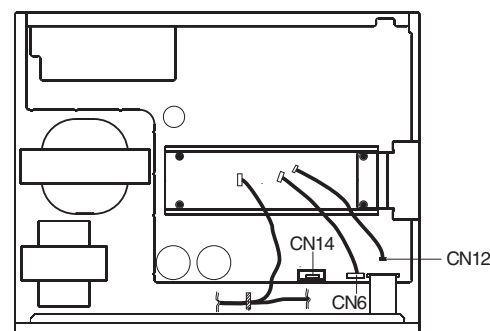
3. Remove the cable connected to CN14 on the main board of the Amplifier.

Connect two internal wiring cables (accessories) separately to CN12 and CN6 on the Amplifier's main board.



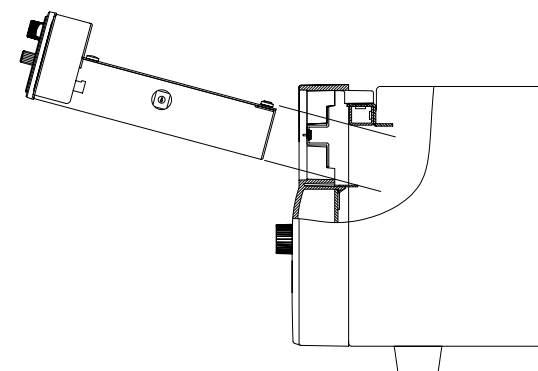
4. Put 3 wiring cables on the heat sink and keep them there.

Under this condition, push this unit all the way in and fix this unit to the Amplifier with the 2 screws, which are removed in step 2.



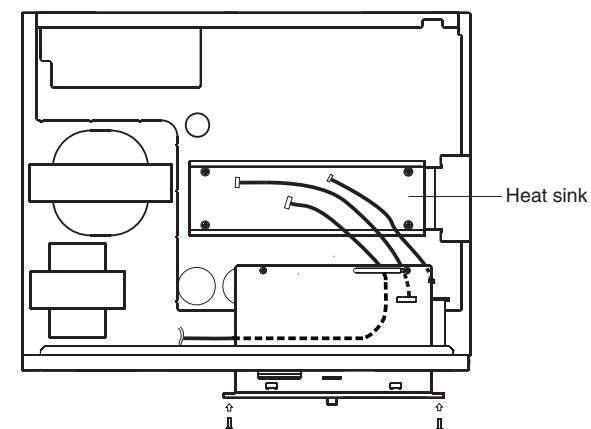
Note:

Uplift the front panel side of this unit when inserting it into the Amplifier. Or else, the cable clamp on the top of this unit may make a hindrance against inserting

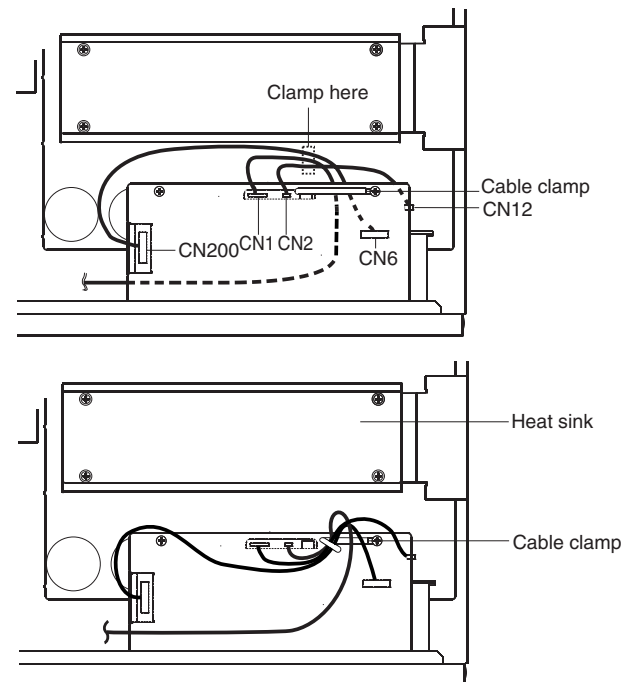


Warning:

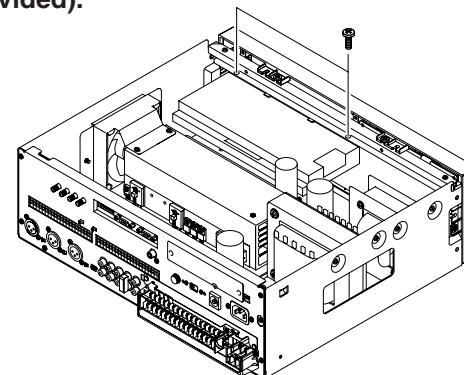
Be cautious not to get your finger clamped when inserting this unit into the Mixing Power Amplifier.



5. Connect the 3 cables to CN1 and CN2 on the back of this unit, and to CN200 on the side of this unit. Then clamp the cables as shown below with the cable clamp, which is installed on this unit. (The cable clamp is made of metal and shielded with black vinyl.)

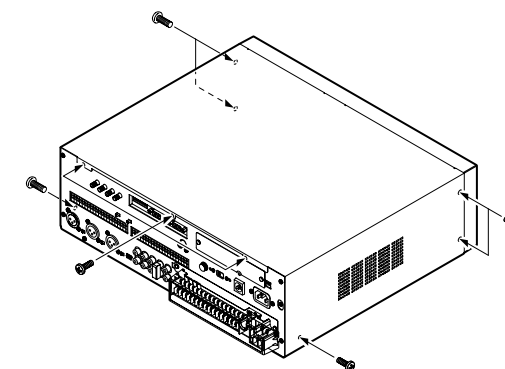


6. Fasten the top of the Sound Message Unit and the Amplifier's frame with two screws (provided).



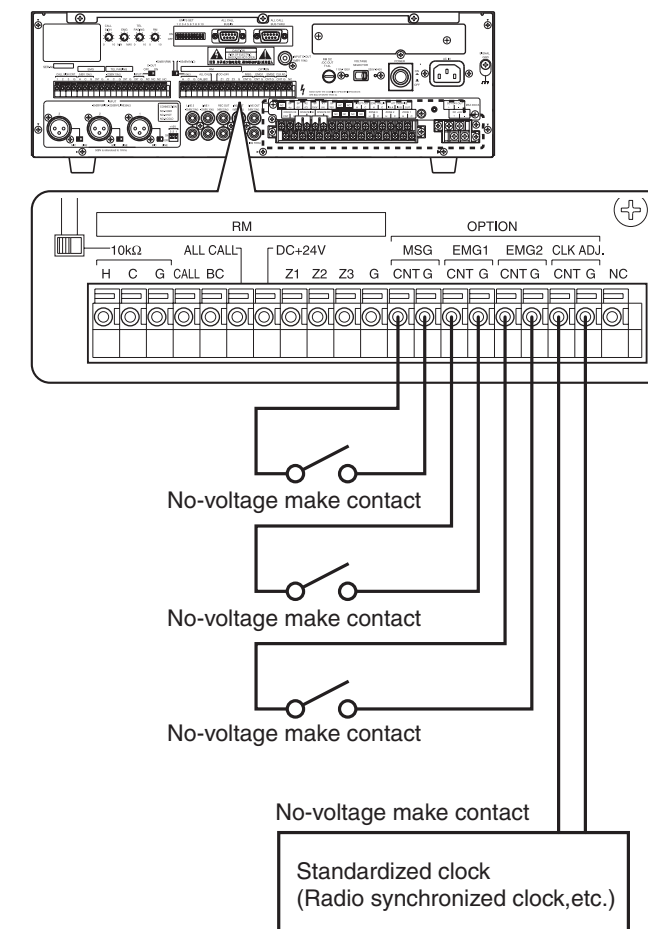
7. Replace the Amplifier's top cover.

Fix the Amplifier's top cover with the screws, which are removed in step 1.



■ Connecting MSG Control Input

MSG Control Input is connected as shown below.

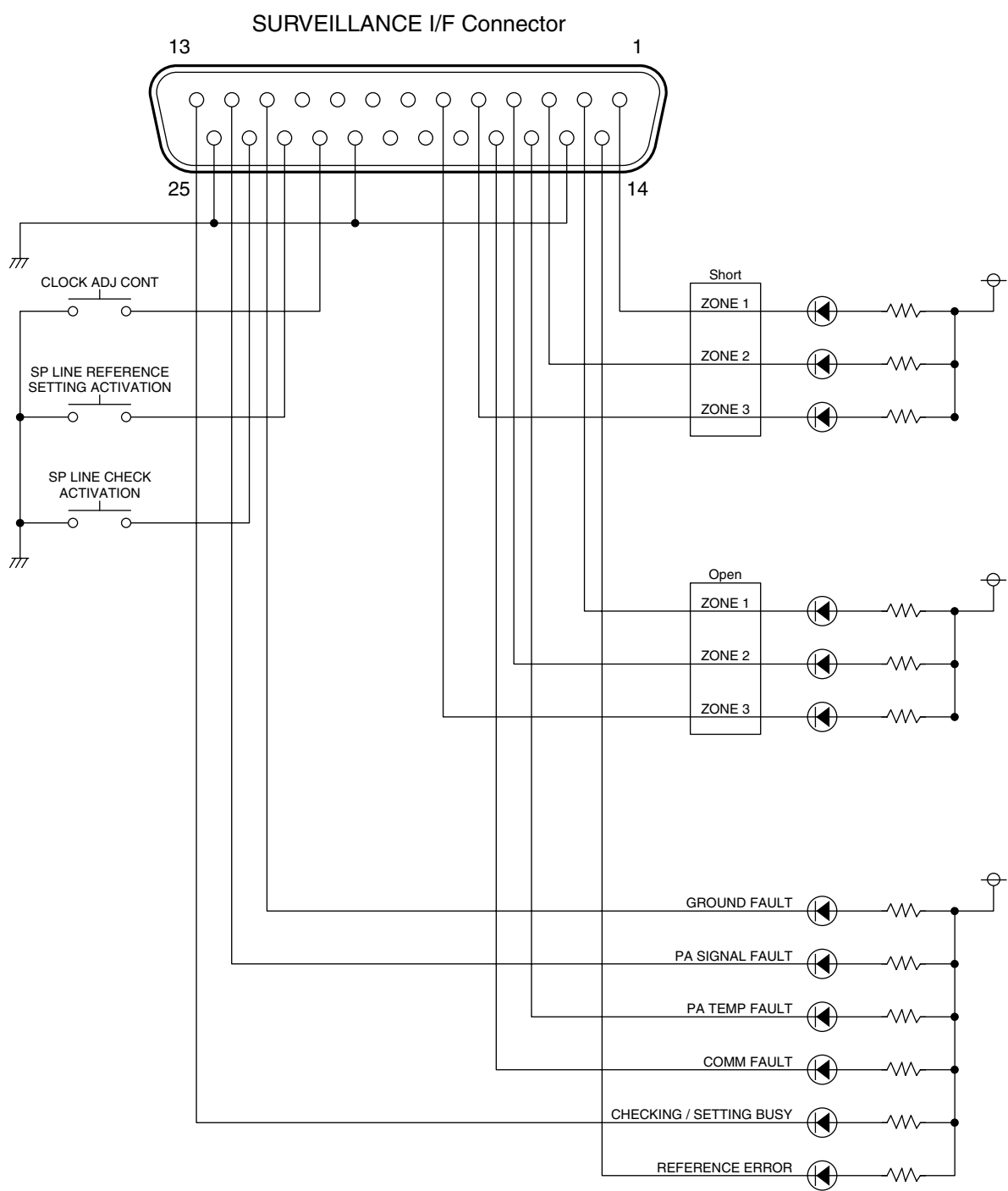
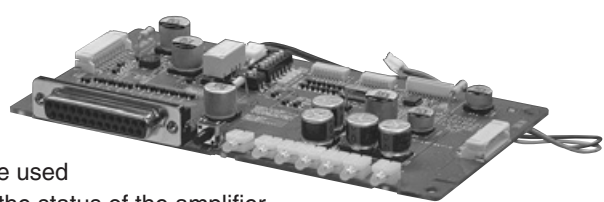


SURVEILLANCE I/F Connector

Example Application: (1)

– Switch Trigger/Status Indication

After connecting to an external line as shown below, the switches can be used to trigger various operations, while indicators can be used to determine the status of the amplifier.

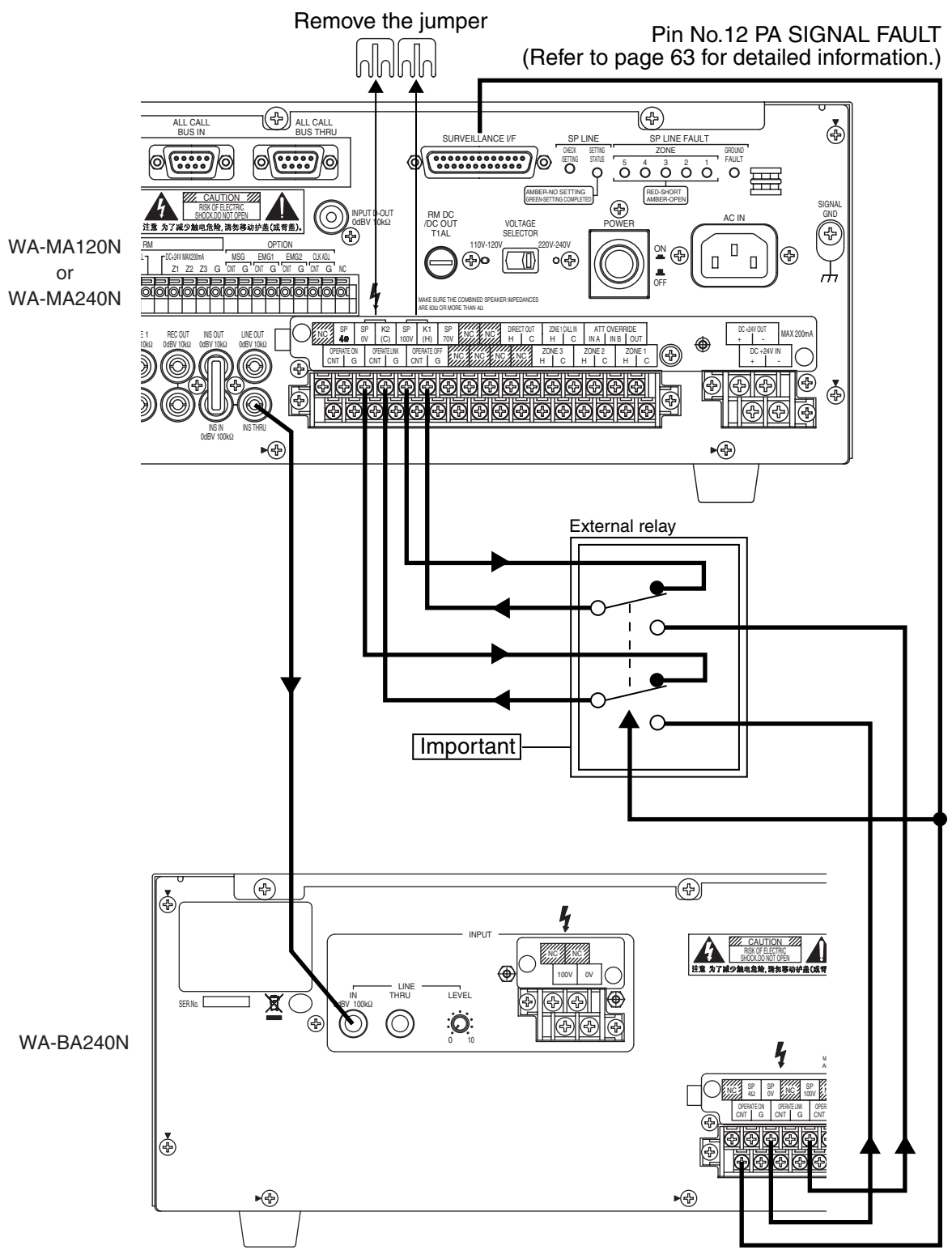


SURVEILLANCE I/F Connector

Example Application: (2)

– Backup Amplifier Connection

After connecting to an external line as shown below, the system can be configured to switch automatically to a backup amplifier whenever a fault occurs on this amplifier.



Important:
Use a 30 VDC 3 A relay or a 250 VAC 3 A relay or greater.

CONNECTIONS

Connectable PA Systems

Refer to the following table to determine the number of Remote Microphones that can be connected to the PA systems.

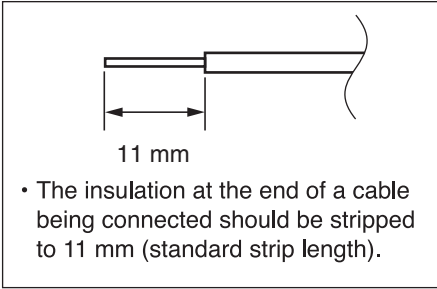
PA System Name		Number of devices that can be connected	
Name	Type	Remote Microphone (WR-210AE)	Extension Unit (WU-RM205E)
Mixing Power Amplifier	WA-MA120N	4	4*
	WA-MA240N	4	4*

*A maximum of 4 Remote Microphones can be connected to each WR-210AE.

Cable Diameters

Cable Lengths	200 m or less	500 m or less
Shielded cable	0.5 mm ² (AWG20) to 1.25 mm ² (AWG16)	
Control cable	ø0.8 mm (AWG20) to ø1.2 mm (AWG16)	ø1.2 mm (AWG16)

- If cables other than those shown above are used, use a cable with 1-wire line resistance that is not in excess of 7 Ω.
- If you plan to move the Remote Microphone while using it, use a stranded conductor cable to extend it.

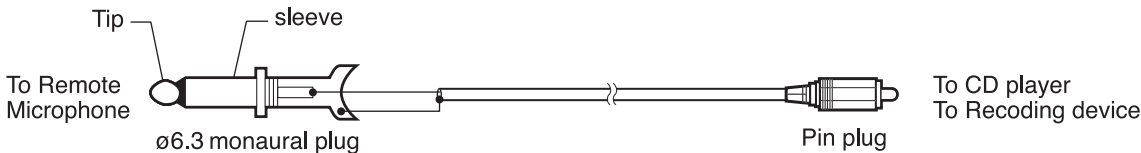


Depending on the PA system being used, the shielded cable connected to the LINE OUT terminal should be either shielded mono cable or shielded pair cable.

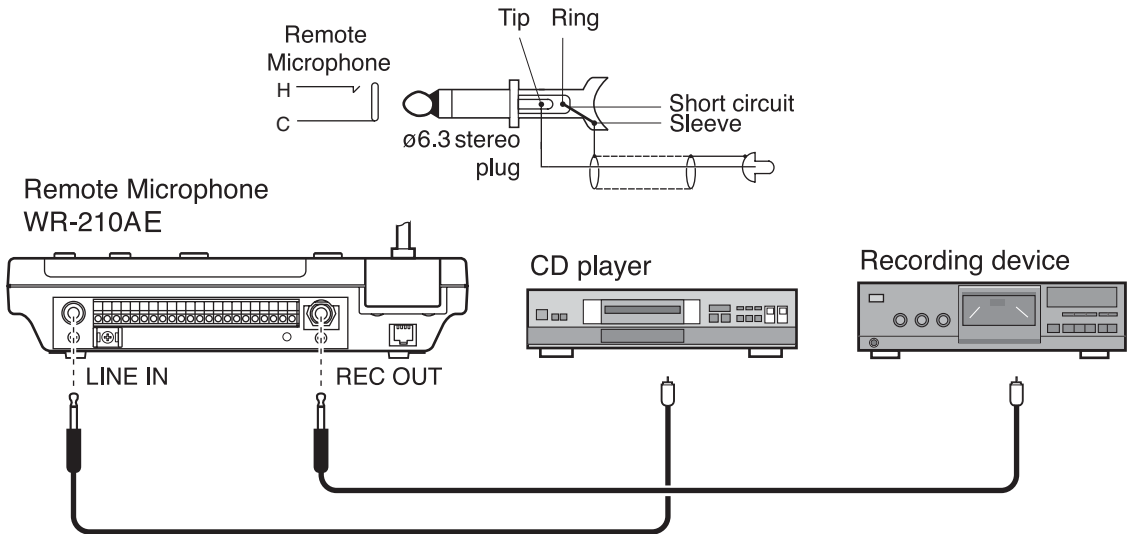
PA System Name	Cable Type
Mixing Power Amplifier	Shielded pair cable

LINE INPUT Terminal and REC OUT Terminal Connection

Connect the pin plug's signal wire and GND wires to the ø6.3 monaural plug's tip contact and sleeve contact respectively.

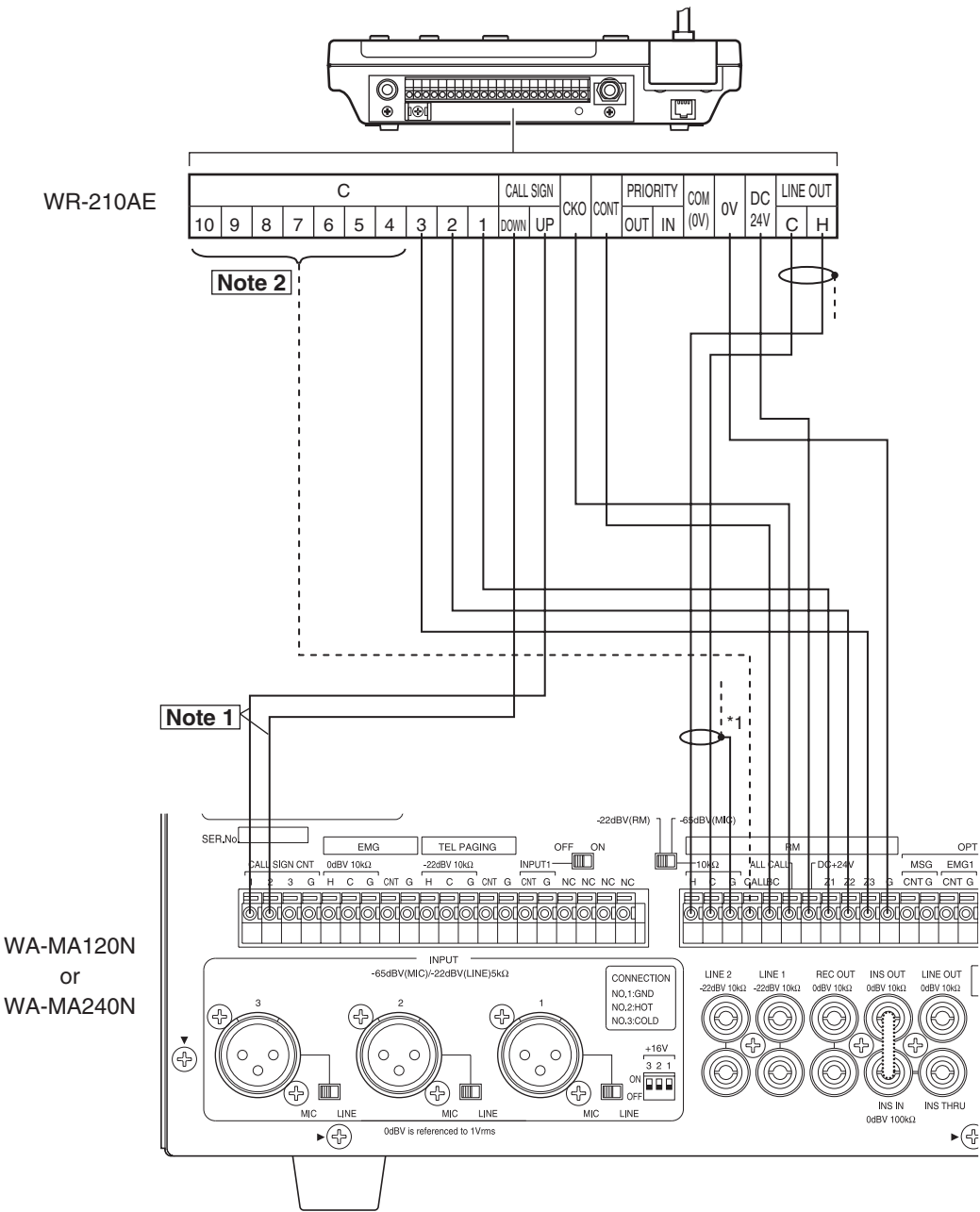


When a ø6.3 stereo plug is used, the connection method is shown below.



Mixing Power Amplifier (WA-MA120N/240N) Connection

Move the -22 dBV(RM)/-65 dBV switch on the Mixing Power Amplifier to the -22 dBV(RM) side.



Note 1: Connect to play the Mixing Power Amplifier's call sign from the CALL SIGN button on the Remote Microphone.

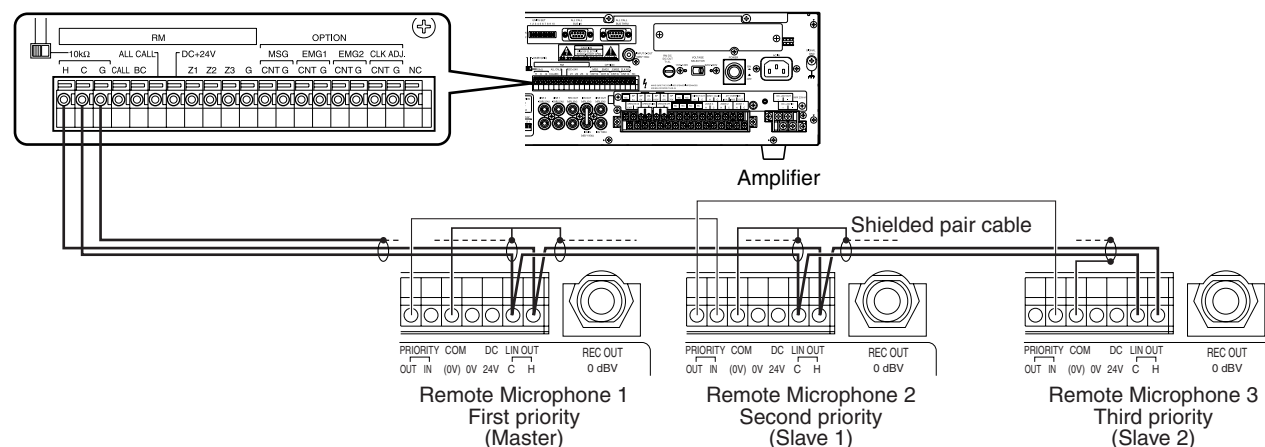
Note 2: To perform 2-channel announcement from the Remote Microphone, connect the CALL terminal to any one of the C4 to C10 terminals of the Remote Microphone. The numbered switch (4-10) on the Remote Microphone that corresponds to the terminal number you connect to can be used to switch to zone 1 interrupt during 2-channel announcement.

*1: Connect to a C terminal to make 2-channel announcements from the Remote Microphone. The number to which the connection was made is the number of the switch for the 2-channel announcements.

Making connection settings

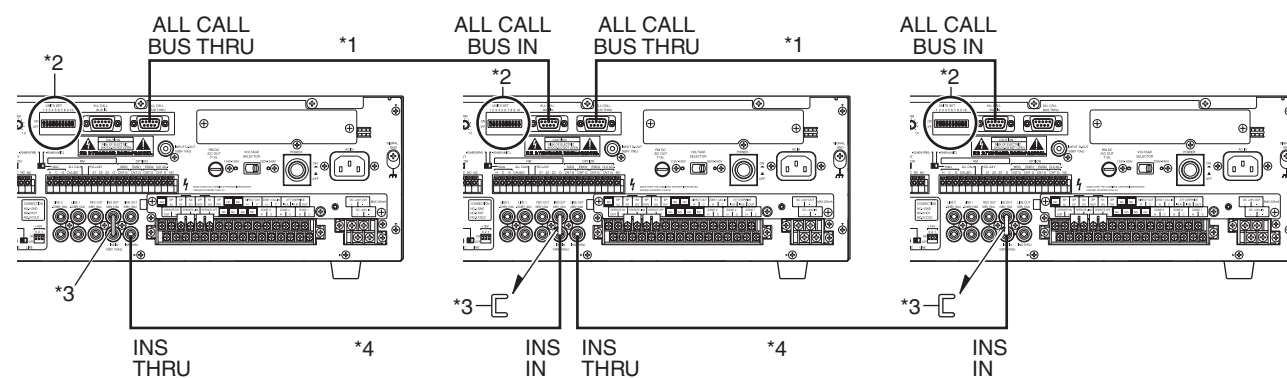
Connect the high priority Remote Microphone's priority output to the low priority Remote Microphone's priority input.

Do not connect the priority input and priority output if the priority order setting is not set. Connect the LINE OUT cables in parallel. Refer to "Mixing Power Amplifier (WA-MA120N/240N) Connection-2" on page 6 and 7 for information about connecting Remote Microphone to Mixing Power Amplifier (WA-MA120N/240N).



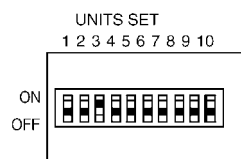
Connections between Mixing Power Amplifiers

Refer to the Operating Instructions of the Mixing Power Amplifier for details.



Refer to the Operating Instructions of the Mixing Power Amplifier for the specifications for the cables.

Example: Turn all “3” ON if three units, including masters and slaves, are connected.



Important: Do not remove the master's short pin. If it is removed, audio will not be output.

Refer to the Operating Instructions of the Mixing Power Amplifier for the specifications for the cables.

MEMO

CONNECTIONS

Connectable PA Systems

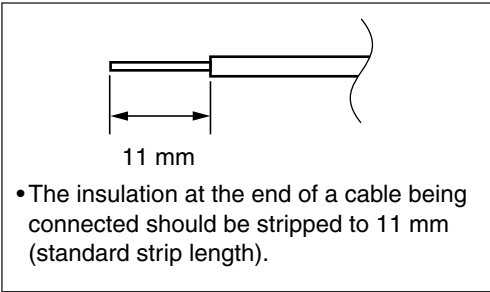
Refer to the following table to determine the number of Remote Microphones that can be connected to the PA systems.

PA System Name		Number of Possible Connections
Name	Type	Remote Microphone (WR-201E)
Mixing Power Amplifier	WA-MA120N	2
	WA-MA240N	2

Cable Diameters

Cable Lengths	200 m or less	500 m or less
Shielded cable	0.5 mm ² (AWG20) to 1.25 mm ² (AWG16)	
Control cable	ø0.8 mm (AWG20) to ø1.2 mm (AWG16)	ø1.2 mm (AWG16)

- Use cables that have a line resistance of 7 Ω or less if one of the cables listed above is not available.
- Use a multicore cable if you intend to move the Remote Microphone freely around on the table while using it.

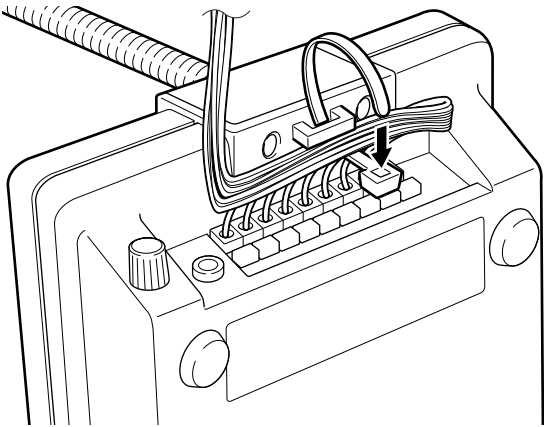


Use an adequate shielded cable (either a one wire or two-wire type according to the PA system being used) for connecting to the LINE OUT terminal.

PA System Name	Cable Type
Mixing Power Amplifier	Shielded pair cable

Binding Cables

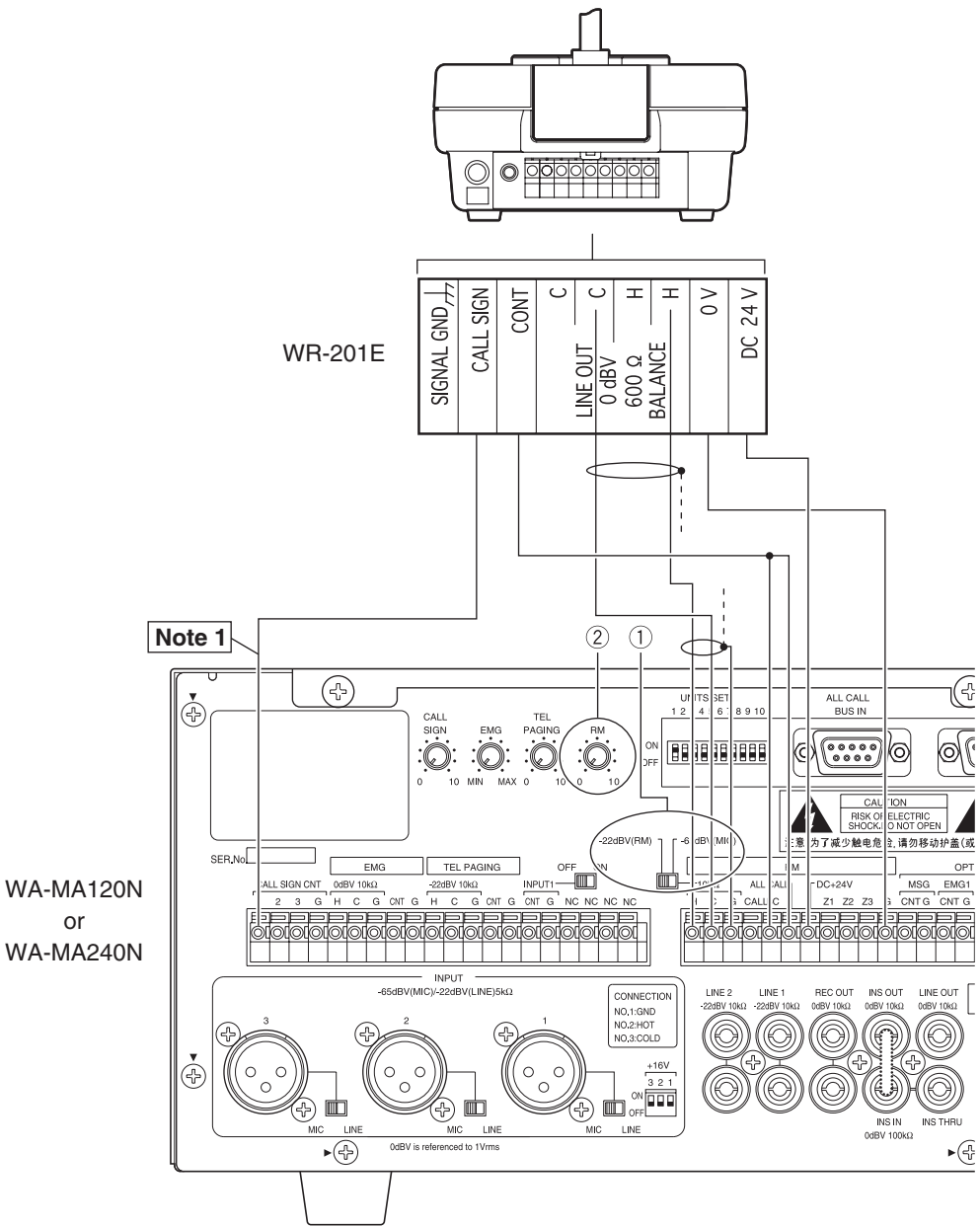
Bind the cables as shown in the figure below.



Mixing Power Amplifier (WA-MA120N/240N) Connection-1

Select -22 dBV (RM) with the switch 1 on the back of the Mixing Power Amplifier.
Volume should be adjusted to the desired level using the Volume control [RM] knob ② on the back of Mixing Power Amplifier (WA-MA120N/240N).

Making connections for all-zone announcements



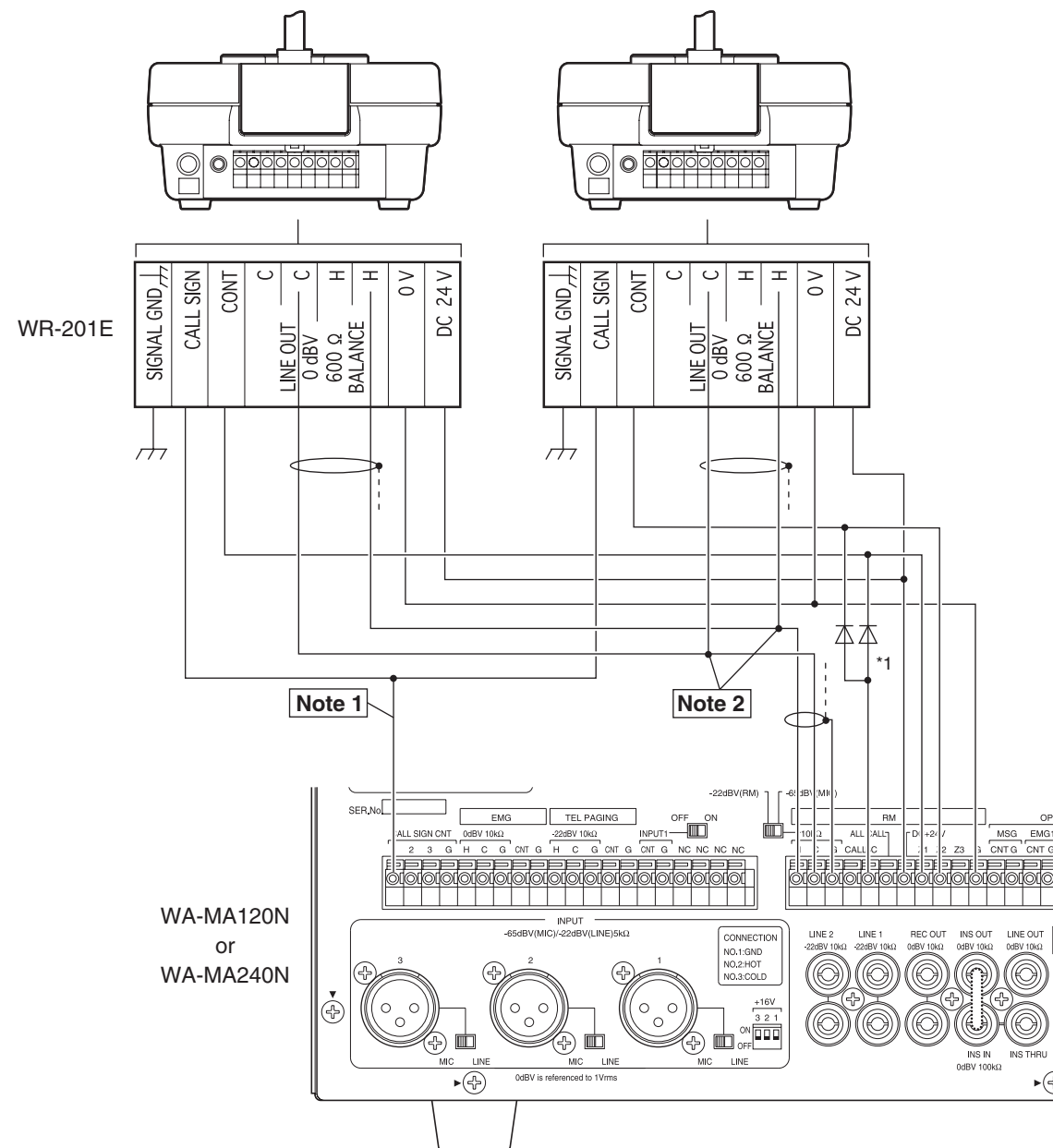
- Note 1:** Connect to play the Mixing Power Amplifier's call sign from the CALL SIGN button on the Remote Microphone.
- Note 2:** When using more than one Mixing Power Amplifiers, refer to the instructions on Connection between Mixing Power Amplifiers. (See page 43.)

- Important:**
- Set the call sign volume-control on the bottom of the Remote Microphone to its lowest setting to use the Mixing Power Amplifier's built-in call sign.

Mixing Power Amplifier (WA-MA120N/240N) Connection-2

Refer to previous page for "Mixing Power Amplifier (WA-MA120N/240N) Connection-1" and the illustration and set ① and ② as well.

Making connections for zone announcements



Note 1: Connect to play the Mixing Power Amplifier's call sign from the CALL SIGN button on the Remote Microphone (WR-201E).

Note 2: When the Remote Microphones (WR-201E) and (WR-201E) are connected to the same system, audio signals are mixed and heard in all connected zones if you operate them at the same time.

Note 3: When using more than one Mixing Power Amplifiers, refer to the instructions on Connection between Mixing Power Amplifiers. (See page 43.)

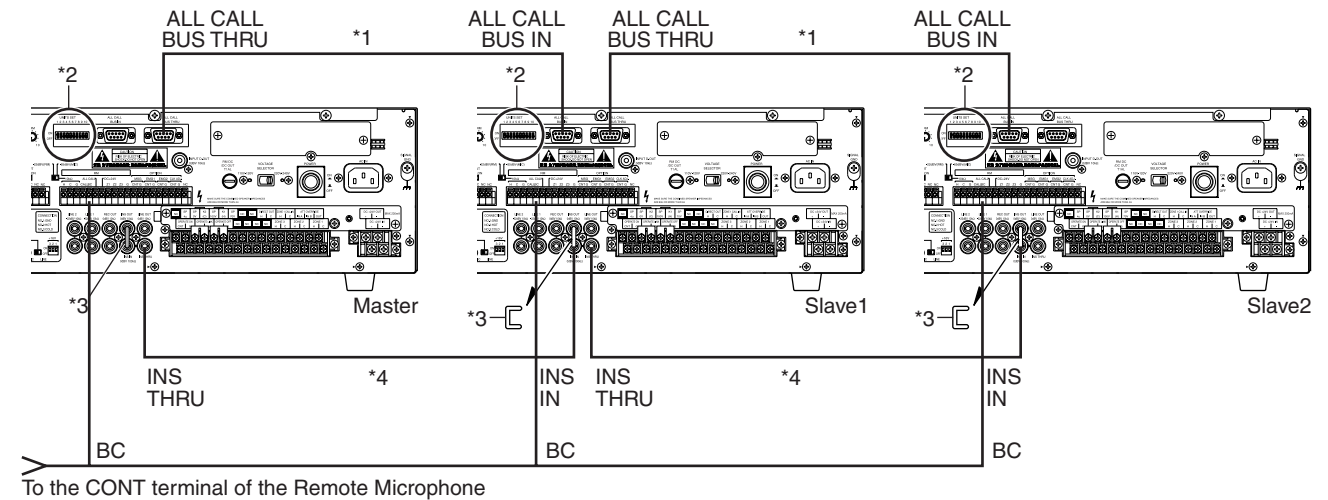
Important:

- Set the call sign volume-control on the bottom of the Remote Microphone (WR-201E) to its lowest setting to use the Mixing Power Amplifier's built-in call sign.

*1 When using more than one Remote Microphone (WR-201E) to make announcements to each block, a reverse current inhibitor diode (forward current 1 A or greater, peak inverse voltage 200 V or greater) is necessary.

Connections between Mixing Power Amplifiers

Refer to the Operating Instructions of the Mixing Power Amplifier for details.



*1: Connect the ALL CALL BUS to be able to make all-line all-zone announcements.

Refer to the Operating Instructions of the Mixing Power Amplifier for the specifications for the cables.

*2: Set all the unit count switches for the total number of Mixing Power Amplifiers connected.

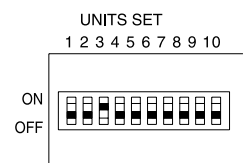
Example: Turn all "3" ON if three units, including masters and slaves, are connected.

*3: Remove the slave's short pin.

Important: Do not remove the master's short pin. If it is removed, audio will not be output.

*4: Connect INS.

Refer to the Operating Instructions of the Mixing Power Amplifier for the specifications for the cables.

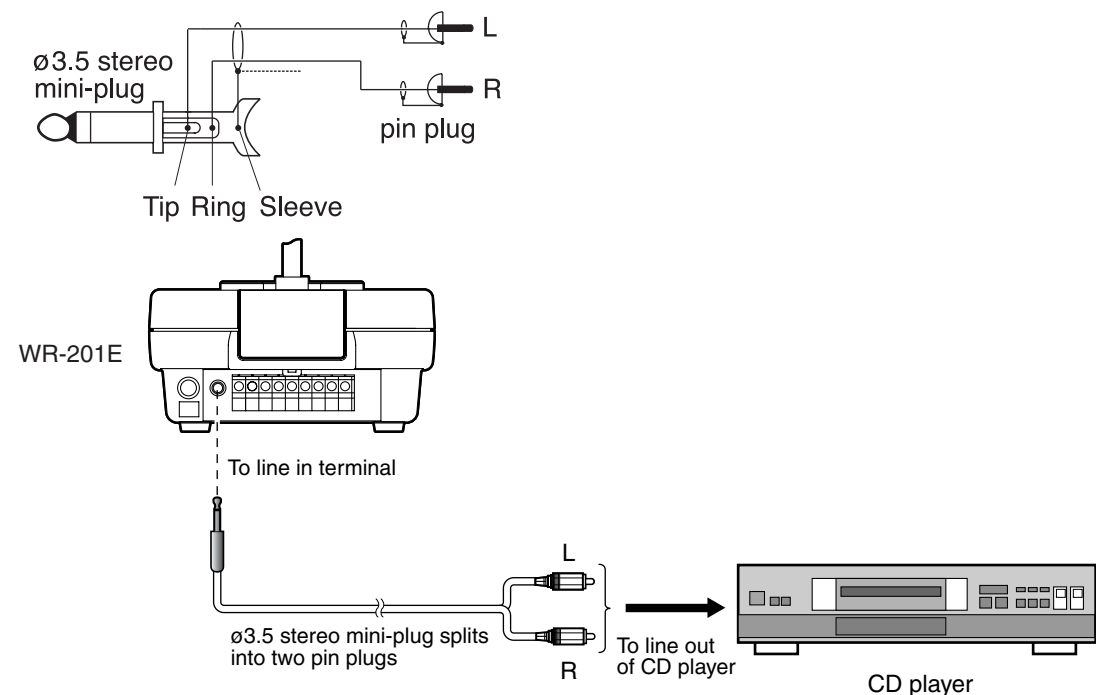


LINE IN Terminal Connection

The Remote Microphone's LINE IN terminal uses a stereo mini-jack.

Commercially available CD players are connected as shown below.

Wiring for the ø3.5 stereo mini-plug and the pin plug is shown below.



Mixing Power Amplifier
WA-MA120N (120 W)



Mixing Power Amplifier
WA-MA240N (240 W)



PREFACE

The WA-MA120N/240N is a Mixing Power Amplifier that features multi-input, announcement priority control, call tone, and other features. You can select either a 120 W model (WA-MA120N) or 240 W model (WA-MA240N) to suit the structure of your system. Features such as 2-channel announcement, Remote Microphone announcement, zone expansion capabilities,

all-zone announcement between different work areas, and other features provide outstanding system flexibility that meets the needs of a wide range of applications, including retail outlets, businesses, office buildings, factories, schools, and more. The term "Amplifier" in this manual refers to the Panasonic WA-MA120N/240N Mixing Power Amplifier.

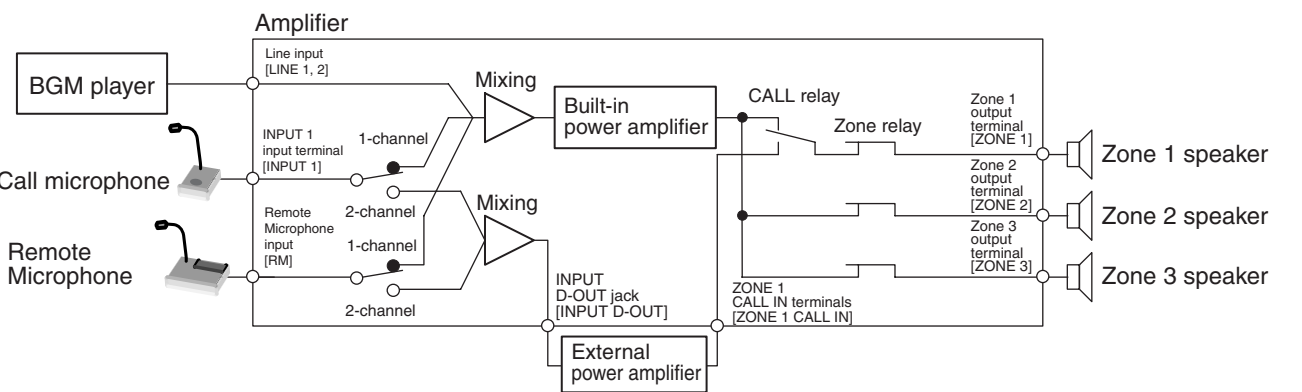
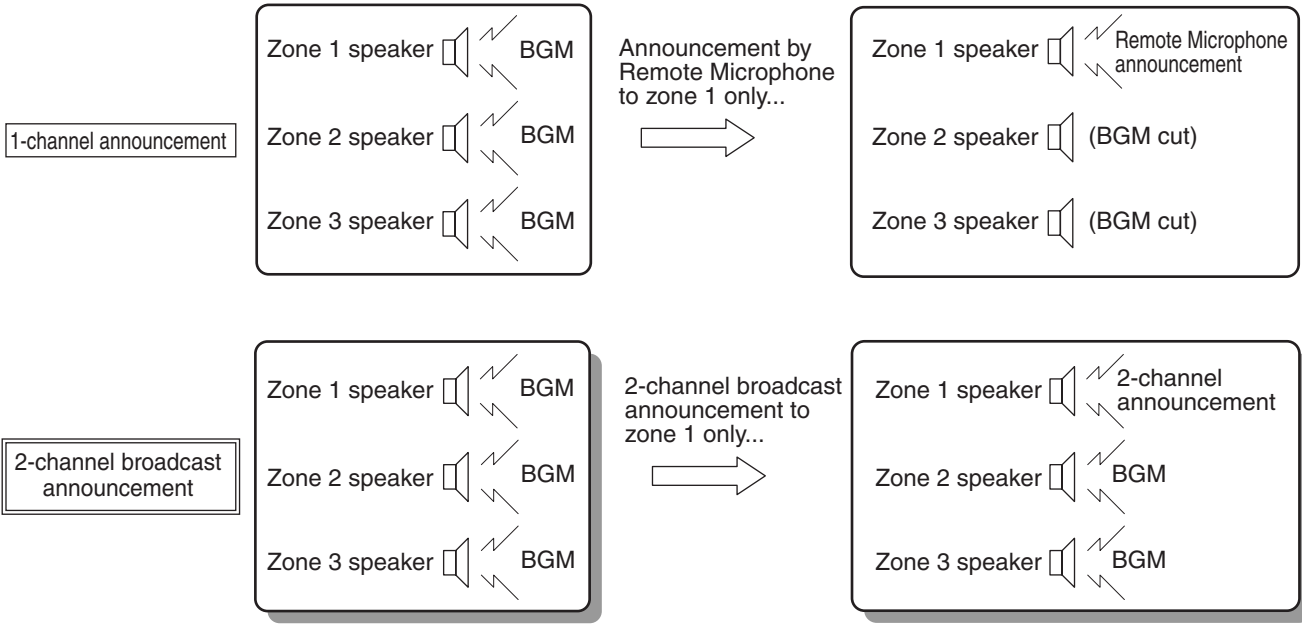
FEATURES

- Can be configured as a 1-channel or 2-channel broadcast announcement system.
- Supports connection of up to four Remote Microphones (WR-210AE). Individual zone, group, all-zone, and 2-channel broadcast announcements are all supported from Remote Microphones.
- Expansion to up to 30 zones is supported by combining up to 10 Amplifier units.
- When multiple Amplifier units are used in combination, all-zone announcement is supported even if each area has a different system configuration.
- Other Functions
 - Multiple inputs for two line inputs, three microphone/line inputs, one Remote Microphone input, one telephone paging input, and one EMG input. Supports connection to business and emergency announcement equipment at a single location.
 - Announcement priority control with four 1-channel

- announcement priority levels (fixed). In case of an emergency call or emergency announcement, lower priority announcements are blocked automatically in accordance with the priority levels.
- Easy switching of high impedance loudspeaker output voltage between 100 V and 70 V for plenty of flexibility to adapt to the needs of each system.
- Equipped with REC OUT, LINE OUT, INS IN/THRU/OUT. The Amplifier can be expanded while connecting equipment to enable announcements required for operation of a particular business.
- External attenuators can be bypassed during all-zone announcement. This allows emergency announcements, even when an attenuator is being used in a local area.
- Operation on/off control can be use for remote switching between operation and non-operation modes.
- Connecting a battery (24 V) allows continued operation in case of a power outage.

2-channel Broadcast Announcement

- This Amplifier supports 2-channel broadcast announcement from INPUT 1 or a Remote Microphone.
- The illustration below shows the concept behind 2-channel broadcast announcement. This function can be used to announce to zone 1 only, without interrupting the BGM being played in zones 2 and 3. Note, however, that zone1 2-channel broadcast announcement is cancelled during all-zone announcement. Because of this, it coincides with the 1-channel announcement and the output audio signal priority for zone 1 is shown in the table below.

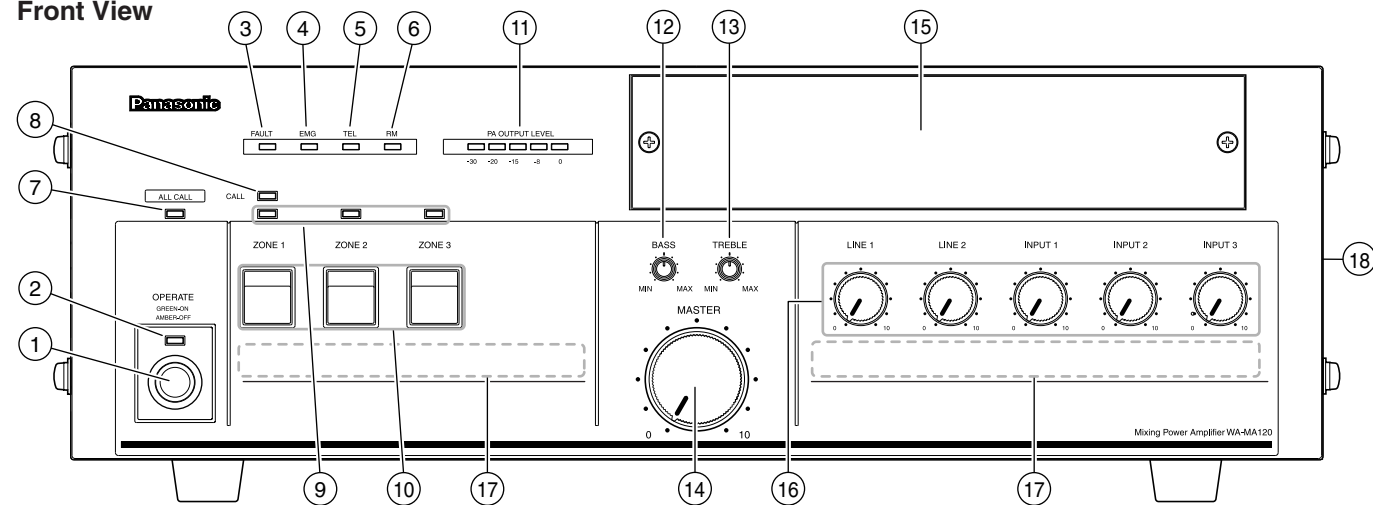


Level	Zone 1 output audio signal source
1	All-zone announcement from emergency announcement equipment
2	All-zone announcement from telephone paging
	All-zone announcement from INPUT 1 (during 1-channel announcement)
3	All-zone announcement from Remote Microphone
4	2-channel broadcast announcement from Remote Microphone
	2-channel broadcast announcement from INPUT 1
5	Individual zone announcement from Remote Microphone
6	INPUT 2, 3, LINE 1,2

- When INPUT 1 and a Remote Microphone are both used for 2-channel broadcast announcement, the input is mixed.

MAJOR OPERATING CONTROLS & TERMINALS

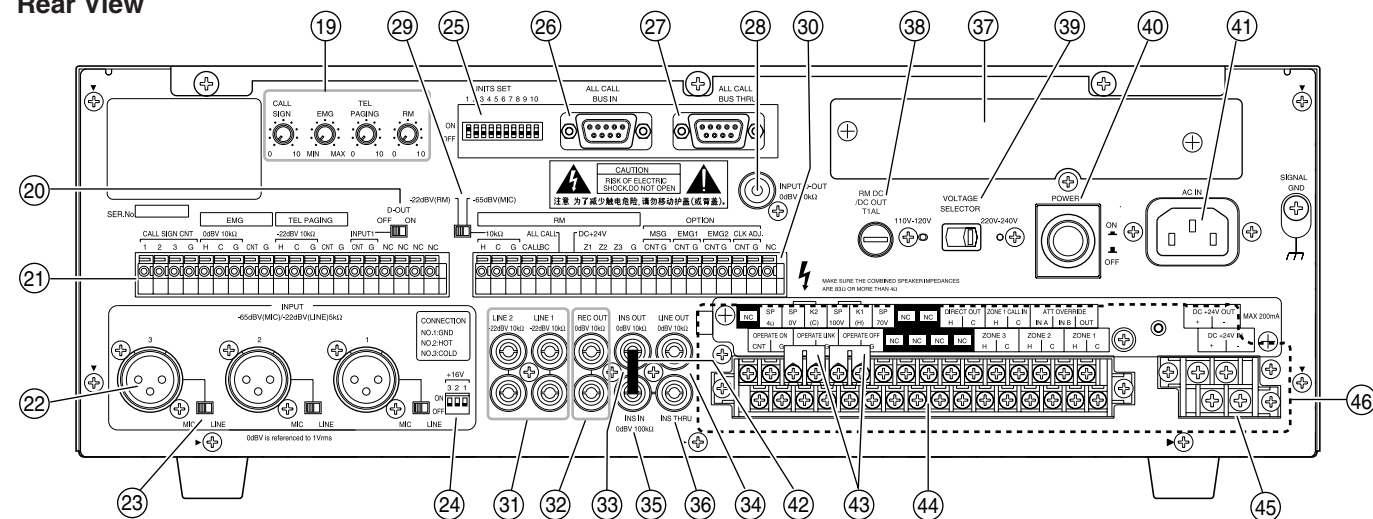
Front View



* The illustration shows the WA-MA120N. The WA-MA240N is the same in both appearance and function.

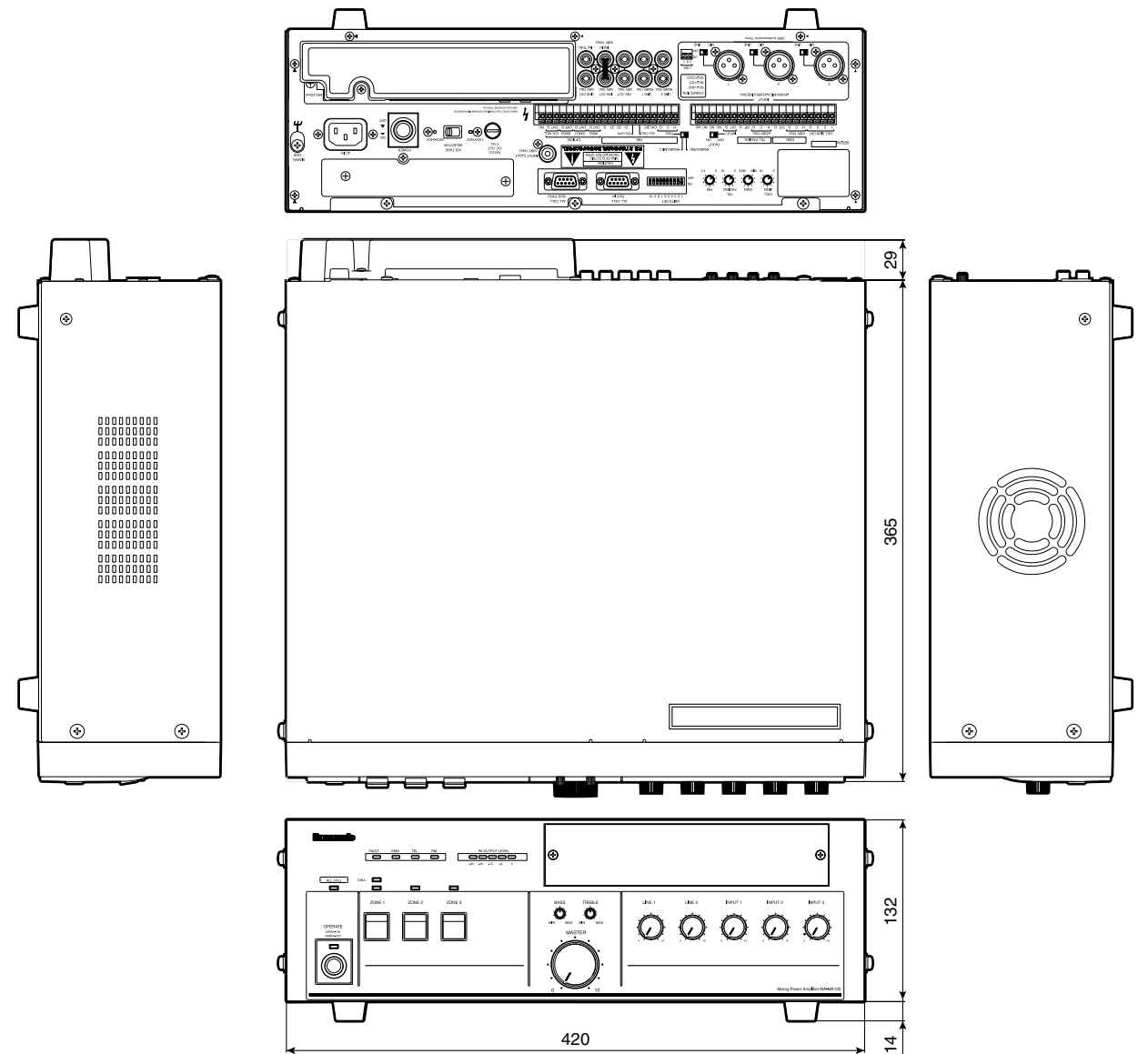
- | | | | |
|---------------------|-----------------------|-----------------------------------|--------------------------|
| ① OPERATE Switch | ⑥ RM Indicator | ⑪ PA OUTPUT LEVEL Meter | ⑬ LINE1,2,INPUT1-3 Knobs |
| ② OPERATE Indicator | ⑦ ALL CALL Indicator | ⑫ BASS Knob | ⑭ Name Label Space |
| ③ FAULT Indicator | ⑧ CALL Indicator | ⑬ TREBLE Knob | ⑮ Cooling Fan |
| ④ EMG Indicator | ⑨ Zone 1-3 Indicators | ⑭ MASTER Knob | |
| ⑤ TEL Indicator | ⑩ ZONE 1-3 Switches | ⑮ Option Board Installation Space | |

Rear View



- | | | |
|--|--|---|
| ⑲ Volume Controls | ⑳ -22 dBV (RM), -65dBV (MIC) Switch | ㉙ VOLTAGE SELECTOR Switch |
| ㉚ INPUT 1 D-OUT Switch | ㉛ Audio Signal/Control Input Terminals | ㉜ POWER Switch |
| ㉝ Audio Signal/Control Input Terminals | ㉞ LINE 1, LINE 2 Jacks | ㉟ AC Power Supply Inlet |
| ㊱ INPUT 1-3 Connectors | ㊲ REC OUT Jack | ㊳ Plug for Short from INS IN to INS OUT |
| ㊴ INPUT 1-3 MIC/LINE Switches | ㊵ INS OUT Jack | ㊶ Jumper for K1(H) and K2(C) |
| ㊷ INPUT 1-3 +16V ON/OFF Switches | ㊸ LINE OUT Jack | ㊹ Power Amplifier/Operation On/Off Control In/Out Terminals |
| ㊺ UNITS SET Switches | ㊻ INS IN Jack | ㊼ +24 V DC In/Out Terminals |
| ㊽ ALL CALL BUS IN Connector | ㊾ INS THRU Jack | ㊿ Input/output Terminal Cover |
| ㋀ ALL CALL BUS THRU Connector | ㋁ Option Board Installation Space | |
| ㋂ INPUT D-OUT Jack | ㋃ RM DC/DC OUT Fuse Holder | |

DIMENSIONS



Unit: mm

ACCESSORIES

Operating Instructions (this manual)1 pc.
 Use the following items for installation work.
 Power Cords (1.8 m).....2 pcs. (1 flat 3-prong plug type, 1 round 2-prong plug type)
 Spare Fuses.....1 pc. (For DC power output)
 Rack Mounting Brackets.....2 pcs.

SPECIFICATIONS

Model No.			WA-MA120N	WA-MA240N
Power Source			AC:110 V-120 V or 220 V-240 V (selectable), 50 Hz /60 Hz DC:+24 V (Battery), M3 screw terminal ^{*1}	
Power Consumption (AC)	Non-operation mode (standby)		25 W	30 W
	Under normal operating conditions according to IEC60065		125 W	225 W
	With rated output signal		360 W	755 W
Current Consumption (DC)	Non-operation mode (standby)		0.5 A	0.5 A
	Under normal operating conditions according to IEC60065		4.5 A	8.5 A
	With rated output signal		10 A	20 A
Rated Output			120 W	240 W
Frequency Response			50 Hz-15 kHz	
Distortion			Less than 1 % at 1 kHz rated output	
Signal- to-Noise Ratio			More than 60 dB (-22 dBV input to ZONE output)	
Tone Control			Bass:±10 dB at 100 Hz, Treble:±10 dB at 10 kHz	
Volume Control	EMG		0 dB to -20 dB	
	Others		0 dB to – ∞ (off)	
Audio Signal Input	INPUT 1-3 Connectors	Audio Signal	MIC:–65 dBV/LINE:–22 dBV (selectable) 5 kΩ, electronically balanced, XLR-3-11 type connector (female)	
		Control (Only INPUT 1)	No-voltage make contact input, open voltage:+5 VDC, short-circuit current:under 1 mA, Push-in terminal ^{*3}	
	LINE 1,2 Jacks		–22 dBV, 10 kΩ, unbalanced, RCA pin jack x2 (monaural)	
	RM Terminal (Remote Microphone Input)	Audio Signal	RM:–22 dBV/MIC:–65 dBV (selectable) 10 kΩ, electronically balanced	
		Control	No-voltage make contact input, open voltage:+5 V DC, short-circuit current:under 1 mA ① CALL (2-channel announcement select) ② BC (activation control of announcement) ③ ALL CALL (activation control of all-zone announcement) ④ Z1 (zone 1 select) ⑤ Z2 (zone 2 select) ⑥ Z3 (zone 3 select)	
		Power Supply	DC+24 V, MAX 200 mA (Up to 4 Remote Microphones (WR-210AE) can be connected)	
		Connector	Push-in terminal ^{*3}	
	TEL PAGING Terminals (Telephone Paging Input)	Audio Signal	–22 dBV, 10 kΩ, electronically balanced	
		Control	No-voltage make contact input, open voltage:+5 V DC, short-circuit current:under 1 mA	
		Connector	Push-in terminal ^{*3}	
	EMG Terminals (Emergency Equipment Input)	Audio Signal	0 dBV, 10 kΩ, electronically balanced	
		Control	No-voltage make contact input, open voltage:+5 V DC, short-circuit current:under 1 mA	
		Connector	Push-in terminal ^{*3}	
	INS IN Jack (Insertion Input)		0 dBV, 100 kΩ, unbalanced, RCA pin jack	
	ZONE 1 CALL IN (for 2-channel Announcement)		100 V or 70 V balanced, M3 screw terminal ^{*2}	
Audio Signal Output	ZONE 1-3, DIRECT OUT Terminals	Output Voltage/ Impedance	100 V/83 Ω (changeable to 70 V/42 Ω)	100 V/42 Ω (changeable to 70 V/21 Ω)
		Connector	M3 screw terminal ^{*2}	

Model No.			WA-MA120N	WA-MA240N
Audio Signal Output	SP4 Ω Terminal (Low Impedance Loudspeaker Output)	Impedance	4 Ω	
		Connector	M3 screw terminal ²	
	LINE OUT Jack		0 dBV, 10 kΩ adapted, unbalanced, RCA pin jack	
	REC OUT Jack		0 dBV, 10 kΩ adapted, unbalanced, RCA pin jack x2 (monaural)	
	INS OUT Jack (Insertion Output)		0 dBV, 10 kΩ adapted, unbalanced, RCA pin jack	
	INS THRU Jack (Insertion Through Output)		Through output from INS IN, unbalanced, RCA pin jack	
	INPUT D-OUT Jack (Input Direct Output)		0 dBV, 10 kΩ adapted, unbalanced, RCA pin jack (Output for 2-channel announcement from INPUT 1 or RM)	
Audio Signal In/Out for expansion	ALL CALL BUS IN/THRU Connectors	Audio Signal	−20 dBV balanced	
		Control	Activation control of all-zone announcement ① from EMG ② from TEL/INPUT 1 ③ from RM	
		Connector	9-pin female D-sub connector x2 (in/through)	
CALL SIGN CNT Terminals (Activation control of built-in call tones)			No-voltage make contact input, open voltage:+5 V DC, short-circuit current:under 1mA, Push-in terminal ³ , 1:4-Tone (Up), 2:4-Tone (Down), 3:2-Tone (Down) One-shot make:single playback, at make:repeat playback	
OPERATE ON/OFF Terminals			No-voltage make contact input, open voltage:+5 V DC, short-circuit current:under 1 mA, M3 screw terminal ²	
OPERATE LINK Terminal			Open collector output, withstand voltage:+30 V DC, operating current:under 50 mA, M3 screw terminal ²	
ATT OVERRIDE Terminals			No-voltage make contact output (transfer type relay), withstand voltage: 30 V DC, 250 V AC, contact current:under 3A (DC/AC), M3 screw terminal ²	
Announcement Priority Control (Input Priority at 1-Channel Announcement)			Priority 1:EMG Priority 2:TEL PAGING, INPUT 1 Priority 3:RM Priority 4:INPUT 2,3, LINE 1,2	
Priority Indicator			EMG, TEL, RM	
PA OUTPUT LEVEL Meter			5 points, -30/-20/-15/-8/0	
Other Functions			• 2-channel announcement by Remote Microphone or paging microphone. • Zone output extension by connecting plural units. (up to 30 zones by 10 units) • All-zone announcement in various operating areas. (up to 10 areas)	
Phantom Power Supply for INPUT 1-3			+16 V, on/off selectable individually	
Power Supply for External Equipment			DC+24 V, MAX 200 mA, M3 screw terminal ¹	
Cooling Fan			3 modes;Stop/Low speed/High speed	
Operating Temperature			0 °C-+45 °C (32 °F -113 °F)	
Dimensions			420 mm (W) x 146 mm (H) x 404 mm (D){13-17/32" (W) x 5-3/4" (H) x 15-29/32" (D)} (Height includes rubber feet and depth includes projections such as rear protect cover.)	
Weight (Approx.)			14 kg (30.87 lbs.)	15.5 kg (34.17 lbs.)
Finish			Panel:Gun Metallic painting (ABS Resin) Case: black painting, Munsell N2.5 or equivalent (steel plate)	
Optional Products			• Remote Microphone:WR-210AE • Booster Power Amplifier:WA-BA240N (240 W)	

0 dB = 1 V
*1 Barrier distance:8.12 mm, Suitable cable gauge:AWG18-14 (Solid)/AWG14 (Stranded)
*2 Barrier distance:6.27 mm, Suitable cable gauge:AWG22-14
*3 Suitable cable gauge:AWG22-14
* Dimensions and weight indicated are approximate.Specifications are subject to change without notice.

CONCEPT

SYSTEM EXAMPLES

CONNECTIONS

PRODUCTS

BLOCK DIAGRAMS

Booster Power Amplifier
WA-BA240N



PREFACE

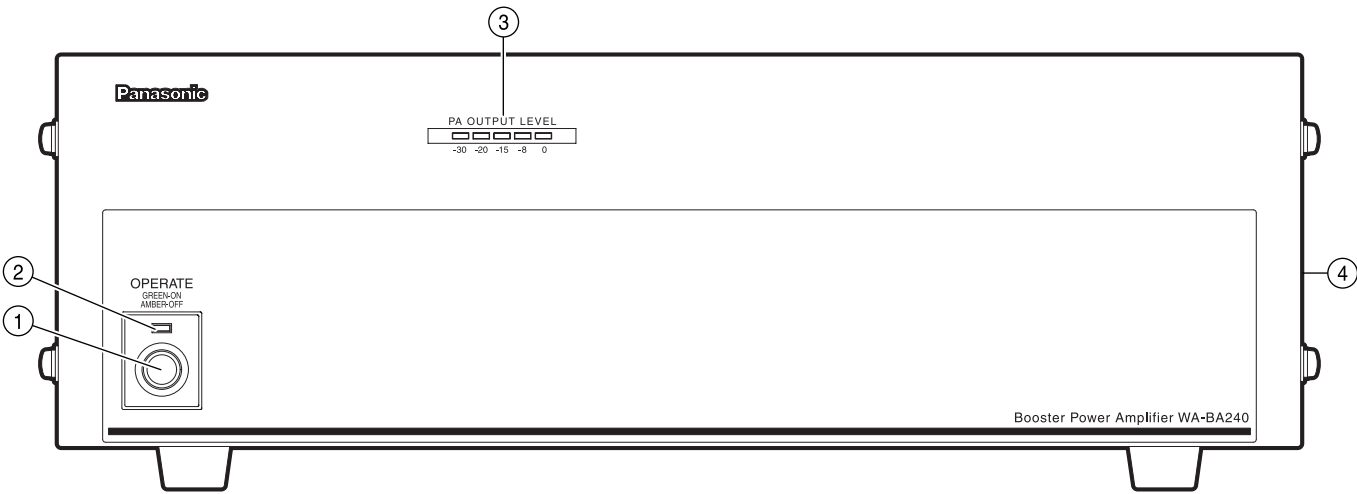
The WA-BA240N is a 240 W output monaural power amplifier. It includes 100 V and 70 V outputs for high-impedance loudspeakers, as well as low-impedance loudspeaker output. Inputs include LINE IN and 100 V. Those who want to expand their high-impedance loudspeakers but feel that the output of their main power amplifier is insufficient can increase the output of their main power amplifier to the 100 V input of the WA-BA240N.

This will provide output up to 240 W from the WA-BA240N, which is enough to support speaker expansion. In addition, operation mode/non-operation mode switching can be performed externally when the WA-BA240N at a distance from the main power amplifier.

The term "Amplifier" in this manual refers to the Panasonic WA-BA240N Booster Power Amplifier.

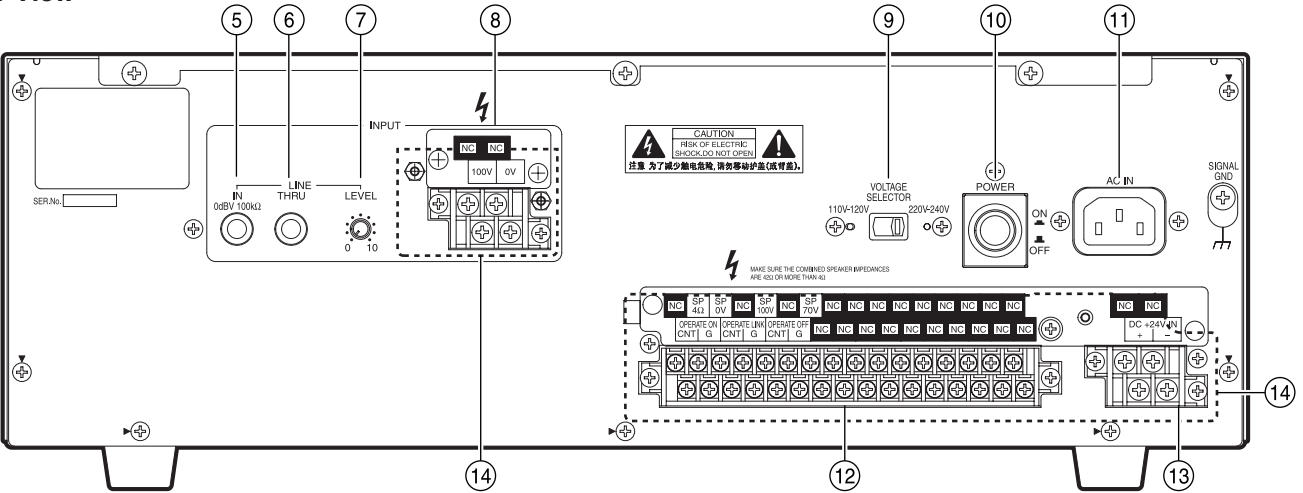
MAJOR OPERATING CONTROLS & TERMINALS

Front View



- ① OPERATE Switch
- ② OPERATE Indicator
- ③ PA OUTPUT LEVEL Meter
- ④ Cooling Fan

Rear View



- ⑤ LINE IN Jack
- ⑥ LINE THRU Jack
- ⑦ LEVEL Knob
- ⑧ 100V, 0V Terminals
- ⑨ VOLTAGE SELECTOR Switch
- ⑩ POWER Switch
- ⑪ AC Power Supply Inlet
- ⑫ Audio/Operation On/Off Control In/Out Terminals
- ⑬ DC +24V IN Terminals
- ⑭ Input/Output Terminals Covers

CONCEPT

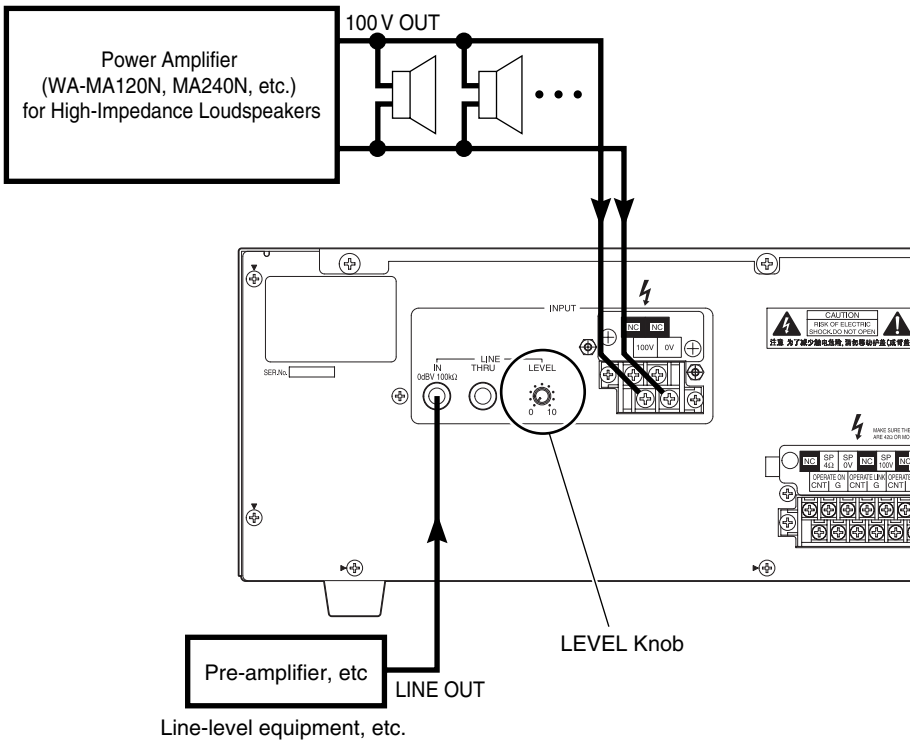
SYSTEM EXAMPLES

CONNECTIONS

PRODUCTS

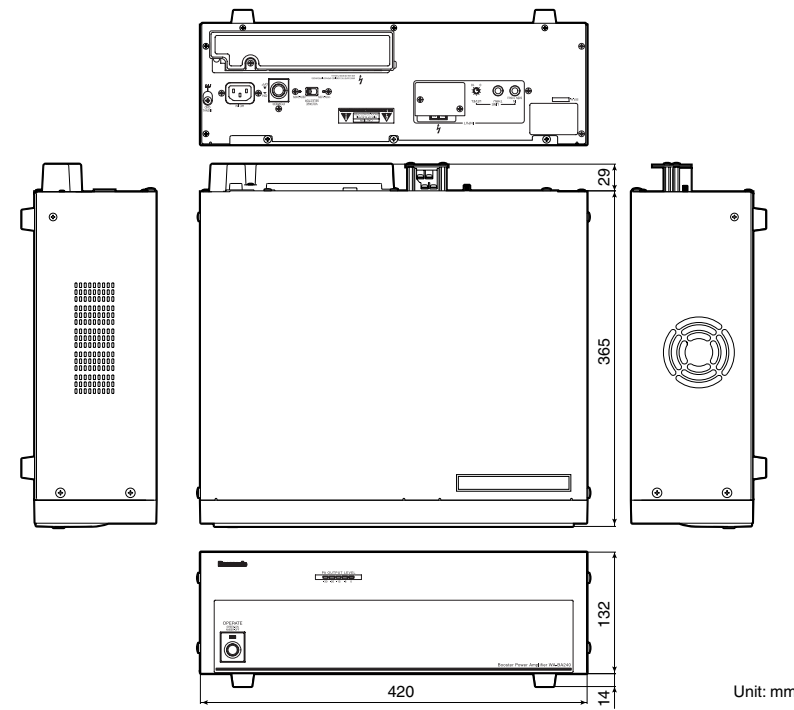
BLOCK DIAGRAMS

ADJUSTING INPUT VOLUME



- When line-level equipment is connected to LINE IN, use the LEVEL knob on the back of the Amplifier to adjust the volume to the desired level.
 - Input volume cannot be adjusted when power amplifier output is connected to 100 V. Adjust the output level of the power amplifier in this case.
- Note:**
- When LINE IN and 100 V are connected to different audio signal sources at the same time, the inputs are mixed.

DIMENSIONS



SPECIFICATIONS

Power Source			AC:110 V - 120 V or 220 V - 240 V (selectable), 50 Hz /60 Hz DC:+24 V (Battery), M3 screw terminal ^{*1}
Power Consumption (AC)	Non-operation mode (standby)		14 W
	Under normal operating conditions according to IEC60065		190 W
	With rated output signal		730 W
Current Consumption (DC)	Non-operation mode (standby)		0.1 A
	Under normal operating conditions according to IEC60065		8 A
	With rated output signal		20 A
Rated Output			240 W
Frequency Response			50 Hz - 15 kHz
Distortion			Less than 1 % at 1 kHz rated output
Signal- to-Noise Ratio			More than 80 dB
Volume Control	LINE IN		0 dB to – ∞ (off)
Audio signal Input	LINE IN Jack		0 dBV, 100 kΩ electronically balanced, Tip-Ring-Sleeve(TRS) phone jack
	100 V Terminal		100 V, transformer balanced, M3 screw terminal ^{*1}
Audio signal Output	LINE THRU Jack		Through output from LINE input, balanced, Tip-Ring-Sleeve (TRS) phone jack
	SP100 V Terminal	Output Voltage /Impedance	100 V/42 Ω
		Connector	M3 screw terminal ^{*2}
	SP70 V Terminal	Output Voltage /Impedance	70 V/21 Ω
		Connector	M3 screw terminal ^{*2}
	SP4 Ω Terminal (Low Impedance Loudspeaker Output)	Impedance	4 Ω
Connector		M3 screw terminal ^{*2}	
OPERATE ON/OFF Terminals			No-voltage make contact input, open voltage:+5 V DC, short-circuit current:under 1 mA, M3 screw terminal ^{*2}
OPERATE LINK Terminal			Open collector output, withstand voltage:+30 V DC, operating current:under 50 mA, M3 screw terminal ^{*2}
PA OUTPUT LEVEL Meter			5 points, –30/–20/–15/–8/0
Cooling Fan			3 modes;Stop/Low speed/High speed
Operating Temperature			0 °C - +45 °C (32 °F - 113 °F)
Dimensions			420 mm (W) x 146 mm (H) x 404 mm (D){16-17/32" (W) x 5-3/4"(H) x 15-29/32" (D)} (Height includes rubber feet and depth includes projections such as rear protect cover.)
Weight (Approx.)			15 kg (33.1 lbs)
Finish			Panel: Gun Metallic painting (ABS Resin) Case:brack painting, Munsell N2.5 or equivalent (steel plate)

0 dB = 1 V

*1 Barrier distance:8.12 mm,Suitable cable gauge:AWG18-14 (Solid) /AWG14 (Stranded)

*2 Barrier distance:6.27 mm,Suitable cable gauge:AWG22-14

* Dimensions and weight indicated are approximate.Specifications are subject to change without notice.

ACCESSORIES

- Operating Instructions (this manual)1 pc.
- Use the following items for installation work.
- Power Cords (1.8 m).....2 pcs. (1 flat 3-prong plug type, 1 round 2-prong plug type)
- Rack Mounting Brackets2 pcs.
- Tip-Ring-sleeve (TRS) phone plug (gold plated)2 pcs.

CONCEPT

SYSTEM EXAMPLES

CONNECTIONS

PRODUCTS

BLOCK DIAGRAMS

CONCEPT

SYSTEM EXAMPLES

CONNECTIONS

PRODUCTS

BLOCK DIAGRAMS

Sound Message Unit
WU-ZM001E



PREFACE

- This Sound Message Unit is intended for installation on the WA-MA120N/240N mixing power amplifier (sold separately).

 - It makes it easier to playback chimes or make announcements that have been recorded to SD memory cards.
 - The built-in program timer function makes it possible to make announcements on a set schedule.
- Emergency messages that have been registered to the internal memory can be played back at the touch of a button.
 - It is easy to create schedules with the support software (for personal computers).

FEATURES

- **Making announcements**
 - Depending on different usage, announcement and emergency announcement could be easily played back as messages.
 - You can make announcements that have been recorded on the sound message unit or a personal computer.
 - You can assign any message to the three MESSAGE 1-3 switches.
 - You can playback not only file in WAV format but also that in MP3^{*1} format.
 - You can make announcements that have been previously set from the MSG Control Input on the mixing power amplifier.
- **Recording messages**
 - You can record messages to the SD memory card from the REC IN terminal.
 - You can switch the REC IN terminal sound source from “Mic” to “Line” depending on the equipment connected.
 - You can listen to the recorded messages on headphones hooked up to the PHONES terminal.
 - Recorded audio signals can be assigned to the MESSAGE 1-3 switches and the MSG Control Input, and played as announcements.
- **Scheduled announcements**
 - You can playback messages according to the schedule, which is configured in advance.
 - Schedules (patterns) can be set in units of one day and the patterns can be assigned to a day.
 - You can make up to nine types of patterns and announcements with 999 steps can be registered for each pattern.
 - You can quickly change the schedule by switching the patterns.
- **Making emergency announcements**
 - There are two types of emergency messages; EMG1 and EMG 2.
 - You can write voice message up to 20 seconds on the internal memory for each EMG1 and EMG2. You can also write a signal up to 10 seconds on the internal memory as a lead for the voice message. Emergency message can be made even if the SD memory card has been removed.
 - You can make emergency announcements by touching just one switch. EMG 1 switch is for EMG 1 and EMG 2 switch is for EMG 2.
 - You can from the mixing power amplifier’s EMG1 Control Input (for EMG1) and EMG2 Control Input (for EMG2).
- **Support software**
 - Support software is provided so you can easily create a schedule on your personal computer^{*2}.
 - Download the schedule data that you create to the SD memory card and just plug it into the sound message unit to make scheduled announcements.
 - This software can also be used to modify the system settings and to manage messages.

^{*1} MP3 is MPEG1 Audio Layer III.
^{*2} Supports Windows 2000 and Windows XP (Home/Professional).
(Languages include English and Simplified Chinese.)

EXPLANATION OF TERMINOLOGY

Name	Explanation
Amplifier	This refers to the mixing power amplifier WA-MA120N/240N.
Emergency message	Special messages announced during emergency situations. There are two messages, EMG1 and EMG2.
EMG1/EMG2	Messages announced in an event of emergency. EMG2 has a priority over EMG1.
Voice message	Message announced in an event of emergency. Please register the message that is to be played in an event of emergency as VOICE MESSAGE. e.g. Fire! Evacuate the building quickly!
Signal	The alarm given before voice message to arouse attention.
Message	Audio messages announced during normal operations. There are two types, MSG and MSGS.
MSG	These messages are created from one sound file. A maximum of 100 MSG can be used.
MSGS	These messages are created from multiple MSG messages. A maximum of 50 MSGS can be used.
Announcement	The back ground music can be interrupted and announcements, such as chimes or other messages, can be made. If an announcement is played back while a different announcement is being played back, the announcement that is made second is played back. All of the messages recorded on the sound message unit are announcements.
BGM	BGM is Back Ground Music (it is a message). If an announcement is made while BGM is playing, the BGM is stopped and the announcement is played back. The BGM starts again when the announcement is finished.

ABOUT THE SD MEMORY CARD

- Be sure to format the SD memory card on this Sound Message Unit before using it. (However, the SD memory card provided was formatted at the factory and does not need to be formatted).
- SD memory cards formatted on a different machine or a personal computer (Windows standard formatting function) cannot be used on this unit. Problems may occur preventing normal recording and playing back from these cards. If this happens, format the card on this unit.
- SD memory cards with the following capacity (8 MB to 2 GB) can be used on this unit. (Panasonic cards are recommended.)
8 MB, 16 MB, 32 MB, 64 MB, 128 MB, 256 MB, 512 MB, 1 GB and 2 GB
- The actual available capacity of the SD card is less than that indicated.
- An SD card other than the recommended one may not work well in this unit.
- Do not use mini SD card or micro SD card.
- Multi Media Cards (MMC) cannot be used.
- If the access lamp is lit or flashing that means that data is being written to or from the card. If the Amplifier is turned off or the SD memory card is removed it may malfunction or the data on the card may be lost.
- The data on the SD memory card may be lost or damaged due to electric interference, static electricity or a malfunction of this unit or the card. Be sure to back up any important data to your personal computer.
- SD logo is a trademark.



ABOUT THE INTERNAL CLOCK

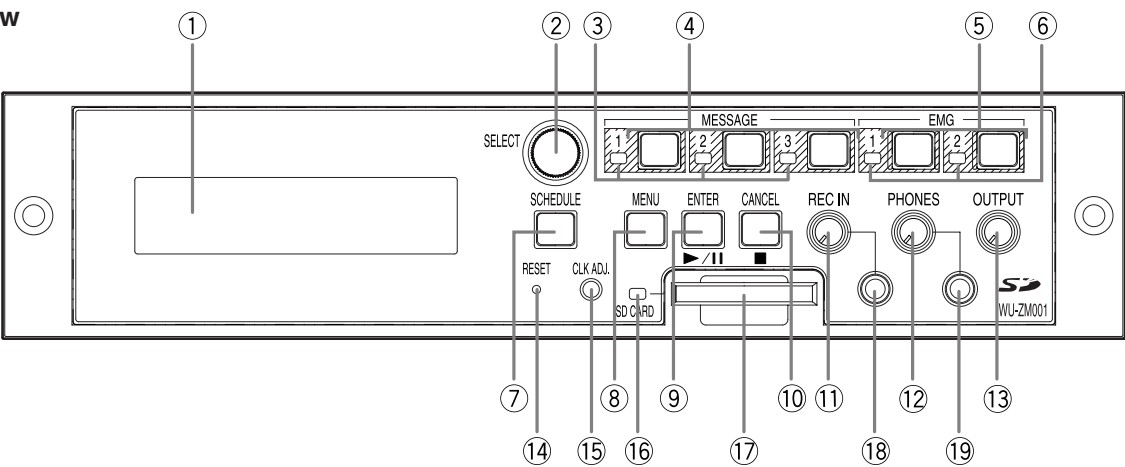
The Sound Message Unit’s internal clock has a back up battery that operates for three months after the AC power is turned off. However, the AC power needs to be hooked up for a minimum of 1.5-2 days to charge the battery.

COPYRIGHT EXPLANATION

Permission from the copyright holder may be necessary for some songs available on the market, depending on the song, the reason it is used and the format in which it is used. Relevant laws should be followed in these situations.

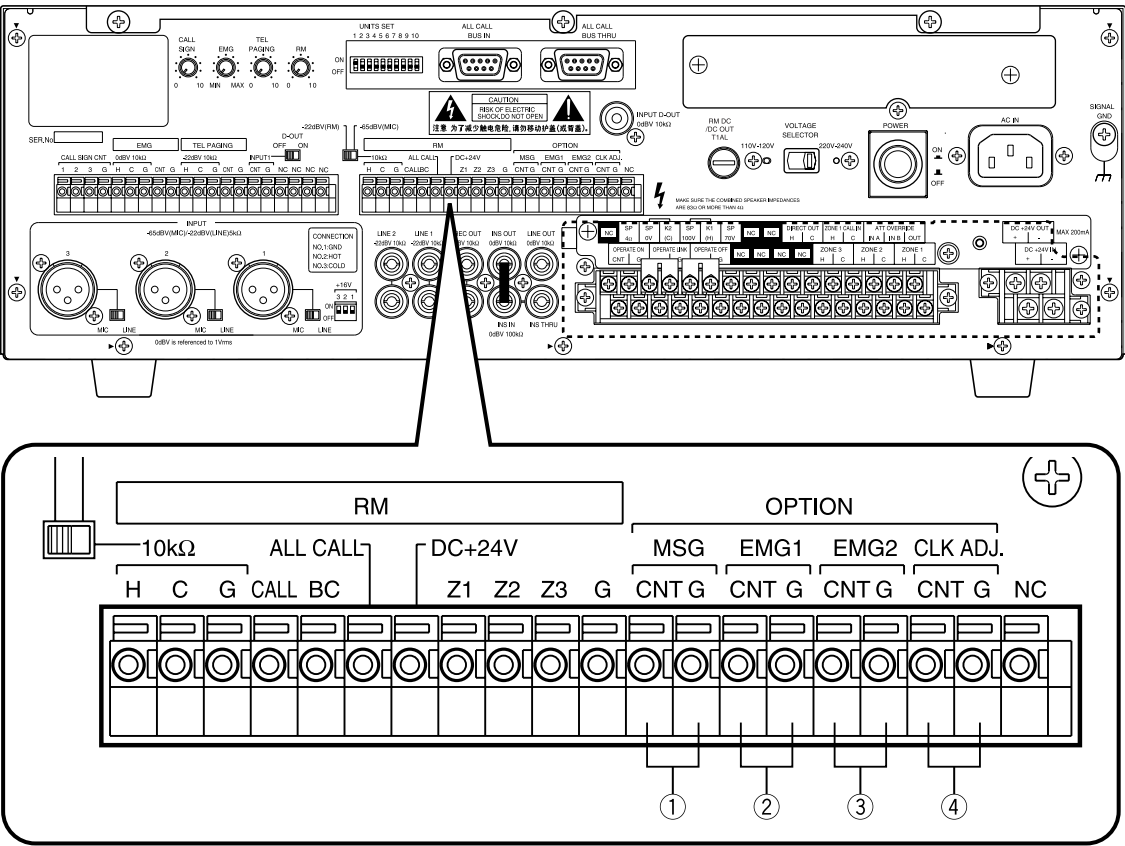
MAJOR OPERATING CONTROLS & TERMINALS

Front View



- ① LCD
- ② SELECT Dial
- ③ MESSAGE 1-3 LED
- ④ MESSAGE 1-3 Switches
- ⑤ EMG 1-2 Switches
- ⑥ EMG1-2 LED
- ⑦ SCHEDULE Switch
- ⑧ MENU Switch
- ⑨ ENTER Switch
- ⑩ CANCEL Switch
- ⑪ REC IN Knob
- ⑫ PHONES Knob
- ⑬ OUTPUT Knob
- ⑭ RESET Switch
- ⑮ CLK ADJ Switch
- ⑯ Access Indicator
- ⑰ SD Memory Card Slot
- ⑱ REC IN Terminal
- ⑲ PHONES Terminal

Rear View



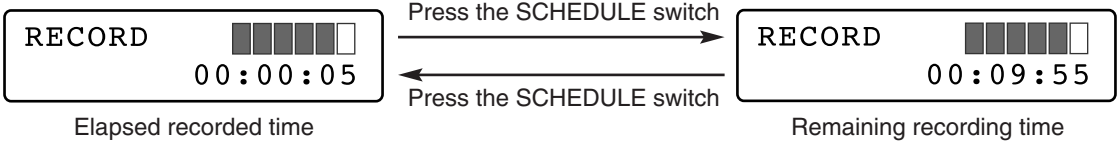
* The illustration shows the WA-MA120N. The WA-MA240N has the same appearance and functions.

- ① MSG CONT Terminal
- ② EMG1 CONT Terminal
- ③ EMG2 CONT Terminal
- ④ CLK ADJ. CONT Terminal

RECORDING METHODS

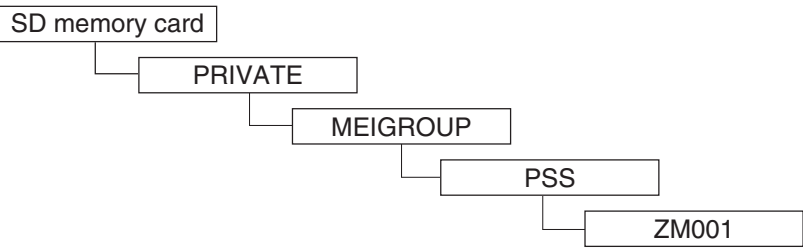
Notes on recording

- Sound data is recorded to the SD memory card. Do not remove the SD memory card during recording.
- You can switch the time display between elapsed recorded time and remaining recording time by pressing the SCHEDULE switch while recording.



Note:
The elapsed/remaining time displayed during recording is not exact. There might be some difference between the displayed time and the actual one.

- The recorded sound data file is saved to the "ZM001" folder on the SD memory card.
- * Folders are generated automatically when the SD memory card is formatted.



Recording formats

The following sound data formats can be recorded to this Sound Message Unit.

Item	Description
File format	Linear PCM (WAV)
Audio sample rate	44.1 kHz
Audio sample size	16 Bit
Stereo/Mono	Mono

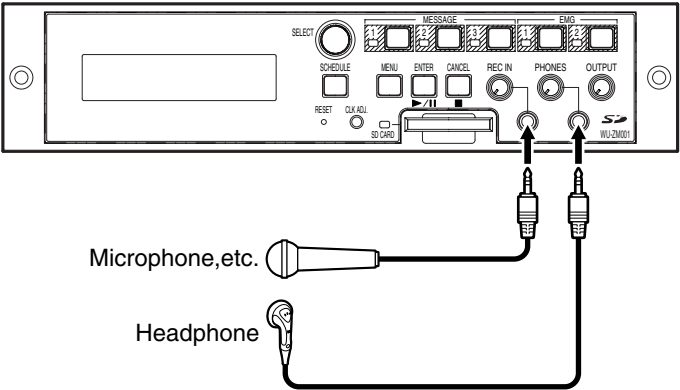
Connecting external equipment

External equipment is connected as shown below.

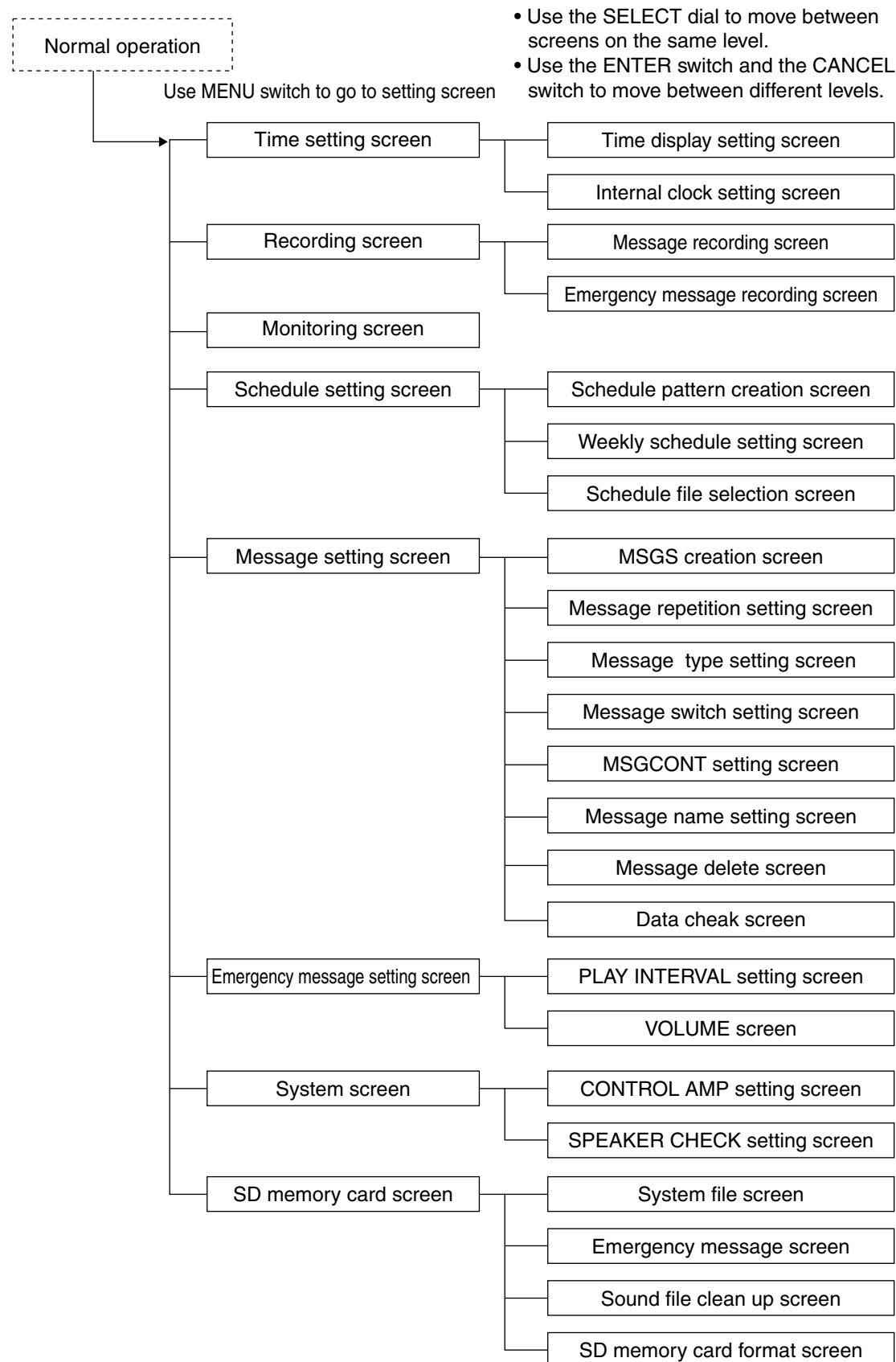
- **Connecting to REC IN**
Connect the external equipment's audio signal out or microphone to this jack. Set the audio signal level (LINE/MIC) to match the device that you are connecting.

- **Connecting to PHONES**
Connect headphones to this jack.

Note:
REC IN terminal of this unit is for unbalanced input. The audio message could not be recorded if the input is balanced. Please use microphones or equipment of unbalanced output.



CONFIGURATION OF MENU SCREEN



SOUND MESSAGE UNIT SUPPORT SOFTWARE

Register sound files to MSG

Tool Bar

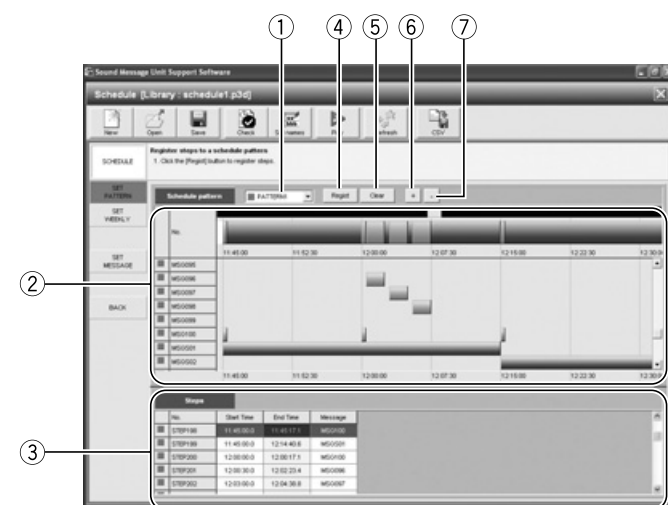
Page Tab

1 [New] Button
2 [Open] Button
3 [Save] Button
4 [Check] Button
5 [Set Names] Button
6 [Play] Button
7 [Refresh] Button
8 [CSV] Button
9 [Menu Name] Label
10 [IMPORT] Tab
11 [REGIST MSG] Tab
12 [REGIST MSGS] Tab
13 [SET MESSAGE] Tab
14 [BACK] Tab
15 [Library] List
16 [SD Memory Card] List
17 [Regist] Button
18 [MSG] List
19 [Clear] Button

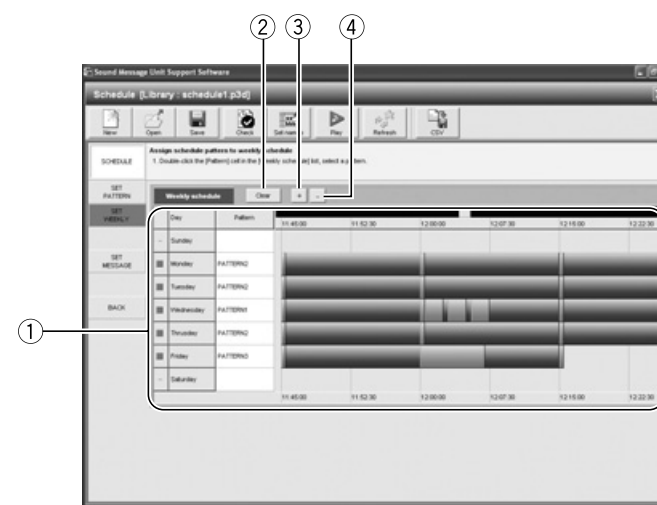
Important: The conditions for sound files that can be registered are shown below.

- Filename has up to 8 bytes of English alphanumeric characters.
- Maximum of 10 minutes in a format that can be played back on the Sound Message Unit.
- Only sound files that are in the Library or on an SD memory card.

Setting schedule patterns



Setting a weekly schedule



SPECIFICATIONS

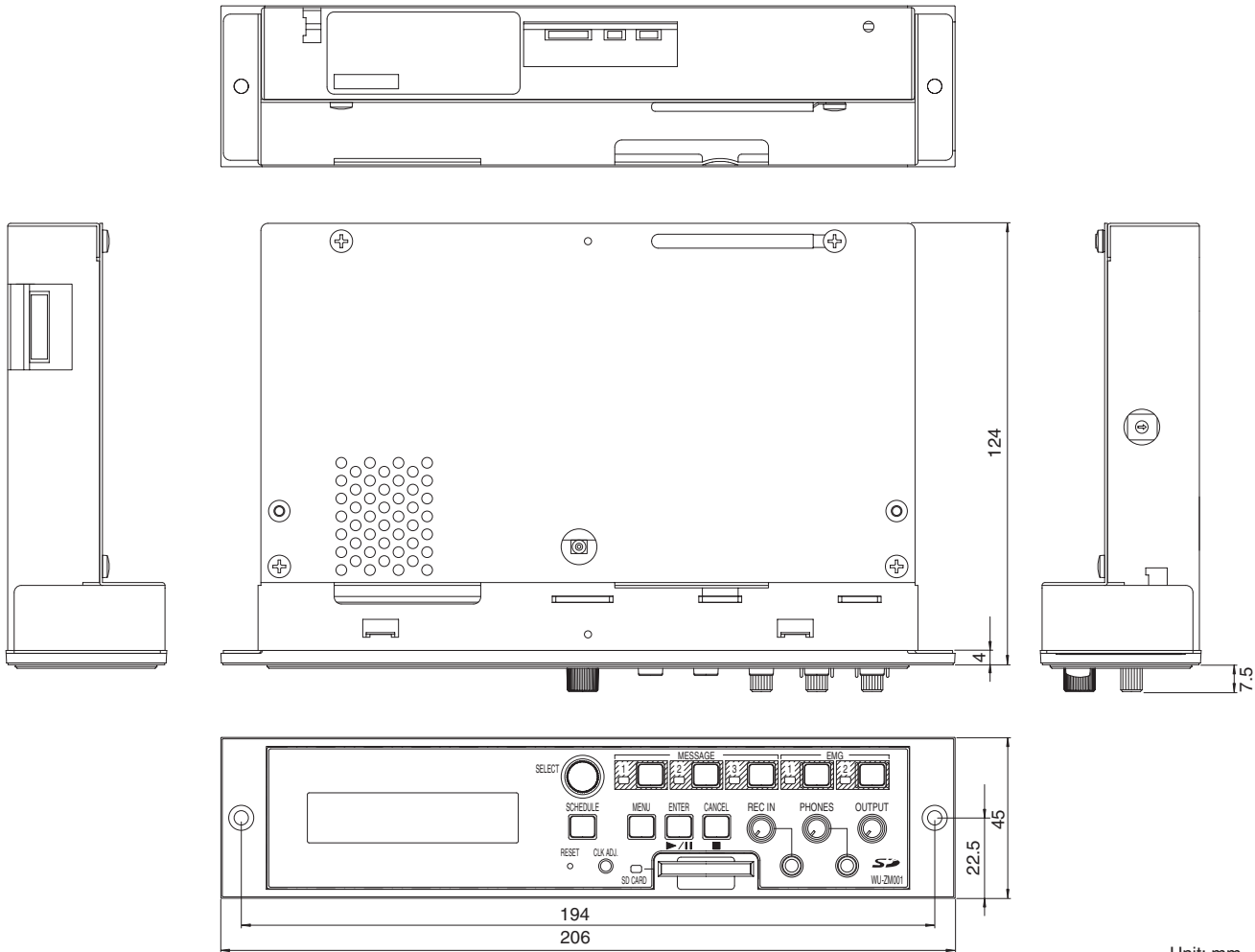
Power Requirements	Rated Voltage	24 V DC (supplied internally by amplifier)
	Consumption Current	Approximately 220 mA
Frequency characteristics	Line system	50 Hz to 15 kHz ± 2 dB
	Microphone system	100 Hz to 10 kHz ± 2 dB
Distortion factor		1 % or less (1 kHz standard)
Audio signal input and output	Recording input	Input level: Microphone -65 dBV/Line -12 dBV alternating, input level is adjustable Input impedance: 10 KΩ unbalanced S/N quotient: 70 dB or higher (Line) Monaural: 3.5 f mini-jack
	Monitor output	Output level: -12 dBV, output level is adjustable Output impedance: 32 Ω unbalanced (load impedance: 32 Ω or higher) S/N quotient: 70 dB or higher Stereo: 3.5f mini-jack
MSG Control Input/Output	EMG1 message execute input [EMG1]	Open circuit voltage 5 V; Short circuit current 1 mA (on back of Amplifier)
	EMG2 message execute input [EMG2]	Open circuit voltage 5 V; Short circuit current 1 mA (on back of Amplifier)
	Regular announcement execute input [MSG]	Open circuit voltage 5 V; Short circuit current 1 mA (on back of Amplifier)
Controls	Clock compensation input [CLK ADJ.]	Open circuit voltage 5 V; Short circuit current 1 mA (on back of Amplifier)
	Emergency message	EMG 1-2 switches [EMG1] and [EMG2]
	Regular announcements	MESSAGE 1-3 switches [MESSAGE1-3]
	Menu controls	LCD: 16 characters x 2 lines MENU switch [MENU], ENTER switch, CANCEL switch [CANCEL], SELECT dial [SELECT], SCHEDULE switch [SCHEDULE], CLK ADJ switch [CLK ADJ.]
	Volume adjustment	REC IN knob [REC IN] PHONES knob [PHONES] OUTPUT knob [OUTPUT]
Storage media		SD memory card (Panasonic cards are recommended) *Up to a maximum of 2 GB
Audio signal format	Playback	WAV format: 44.1 kHz, 16 bit, MONO MP3 format: 44.1 kHz, 128 kbps, STEREO * STEREO audio signals are played back mixed on both channels.
	Recording	WAV format: 44.1 kHz, 16 bit, MONO * Maximum continuous recording time is 10 minutes.
Scheduled announcements		Schedule pattern assigned to day of the week 9 types of schedule patterns 999 steps possible for each pattern 100 types of messages or combined messages can be set for each step
Emergency message		2 types of messages, EMG1 message and EMG2 message can be written to the internal memory Each message has a signal tone (10 seconds) and a message (20 seconds)

Support software	Computer software provided (compatible with Windows 2000 and XP) Supported languages: English and Simplified Chinese
Accuracy of the internal clock	The margin of the monthly error:±30 seconds (25°C)
Operating temperature range	0 C° to +45 C°
Dimensions	206 mm (W) x 45 mm (H) x 124 mm (D) * Excluding protrusions.
Weight (Approx.)	665 g
Finish	Panel: Gun metal coating

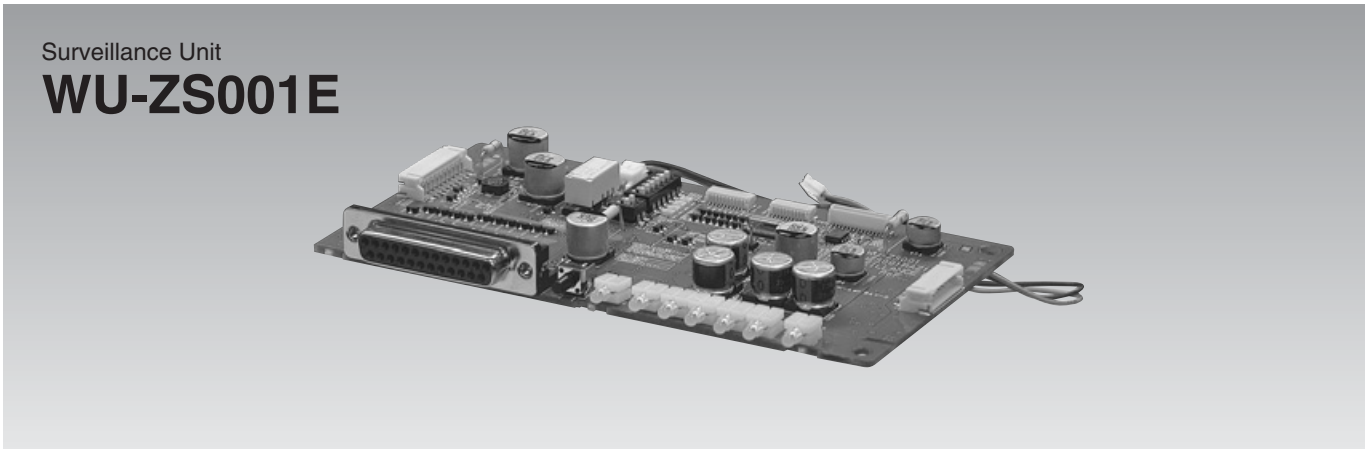
ACCESSORIES

Operating Instructions (this manual)	1 pc.	Use the following items for installation work.	
Support software (CD-ROM).....	1 pc.	Internal Connection Cables.....	2 pcs.
SD memory card (64 MB)	1 pc.	Screws (M3 x 6)	2 pcs.

DIMENSIONS



Unit: mm



PREFACE

This Surveillance Unit is intended for installation on the WA-MA120N/240N Mixing Power Amplifier (sold separately). Installation of the Surveillance Unit ensures system reliability and safety by detection of speaker line failures, as well as audio signal problems and abnormally high temperatures in the amplifier.

- Detects and notifies speaker line faults (shorts, disconnections, grounding), amplifier audio signal problems, and abnormally high amplifier temperatures.
- A built-in interval timer schedules automatic checks for speaker line failures at a preset interval.
- Non-stop monitoring for amplifier audio signal problems and

abnormally high temperatures, and notifies when abnormalities are discovered.

- Speaker line failure detection can be executed by Sound Message Unit scheduler.
- Switch operation allows manual execution of speaker line check.
- SURVEILLANCE I/F connector supports execution of speaker line check and acquisition of each fault notification.
- Fault notification from the SURVEILLANCE I/F connector allows configuration of a system that switches to a backup amplifier when the power amplifier has a problem.

FEATURES

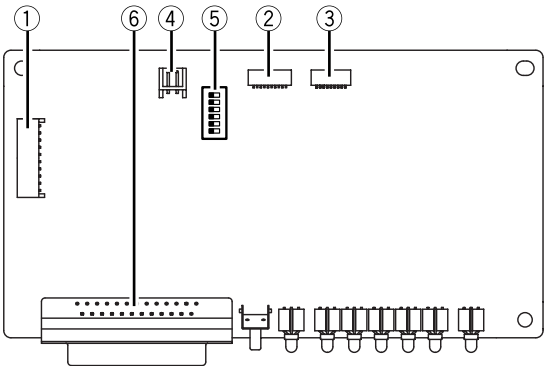
- **Speaker Line Check**
 - Speaker lines can be checked individually for shorts and disconnections.
 - Overall speaker line check for grounding.
 - Speaker line check is performed according to the time interval setting.
- Notification about any faults occurred during the time interval will not be made at once. See the illustration below for details.
-
- Check interval can be set to none, 10 minutes, 60 minutes, or 24 hours. The factory default setting is 24 hours.
 - Execution of speaker line failure detection cancelled during all-zone announcement. And it will not be resumed automatically when all-zone announcement ends.
 - Indicators on the front panel of the mixing power amplifier signal malfunction. Notification of the fault is also sent from the SURVEILLANCE I/F connector at the same time. Detection of a short in a speaker line causes automatic cut off of the line's output.
 - CHECK/SETTING switch can be used to execute the speaker line check or to set the line impedance reference

- value. The same setting is also possible from the SURVEILLANCE I/F connector.
- The Surveillance Unit's indicator and the FAULT indicator on the front of the mixing power amplifier flash to indicate that speaker line failure detection is in progress and while the line impedance reference value is being obtained.
 - Detection of a short causes the applicable line to be cut.
 - The speaker line check will not be performed during all-zone announcement.
- And when there is no all-zone announcement, it will be performed as scheduled by the time interval setting.
- **Detection of Amplifier Audio Signal Problems**
 - Audio output of the amplifier is constantly monitored to ensure operation is normal.
 - Indicators on the front panel of the mixing power amplifier signal problems. Notification of the problem is also sent from the SURVEILLANCE I/F connector at the same time.
 - **Detection of Abnormally High Amplifier Temperature**
 - The amplifier is constantly monitored to ensure normal temperature increase.
 - Indicators on the front panel of the mixing power amplifier signal abnormalities. Notification of the abnormality is also sent from the SURVEILLANCE I/F connector at the same time.

MAJOR OPERATING CONTROLS & TERMINALS

Top of Unit

- ① CN101 Terminal
- ② CN102 Terminal
- ③ CN103 Terminal
- ④ CN104 Terminal



⑤ DIP Switches

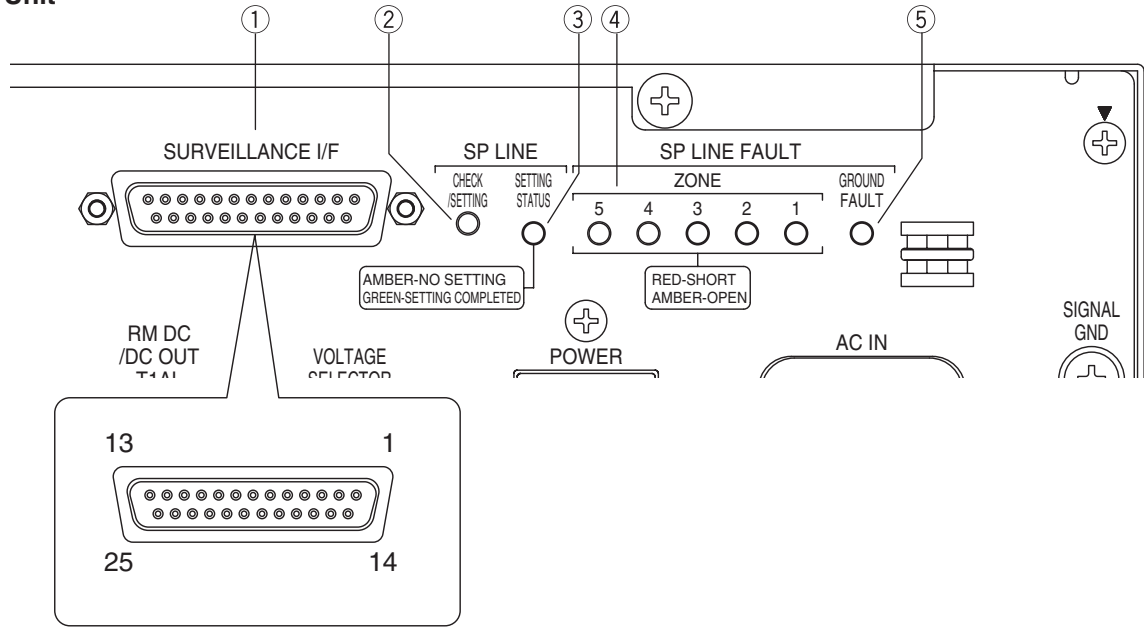
DIP Switch Number	Name	Description	Settings	Factory Default
1	Fixed settings	Fixed at factory default setting	—	ON
2	TIMER1	Interval timer setting 1	None/10 minutes/60minutes/24 hours	24 hours
3	TIMER2	Interval timer setting 2		
4	MASTER/SLAVE	Master/slave setting	MASTER/SLAVE	MASTER
5	POWER ON CHECK	Power on speaker line check setting	ON/OFF	ON
6	BUS SYNC ENABLE	Speaker line test sync on/off for multi-amp connection	ON/OFF	OFF

⑥ SURVEILLANCE I/F Connector

Pin Number	Signal Name	IN/OUT	Signal/Logic	Required Action
1	ZONE1 SHORT	OUT	Active Low	Zone 1 speaker line is shorted.
2	ZONE1 OPEN	OUT	Active Low	Zone 1 speaker line is disconnected.
3	ZONE2 SHORT	OUT	Active Low	Zone 2 speaker line is shorted.
4	ZONE2 OPEN	OUT	Active Low	Zone 2 speaker line is disconnected.
5	ZONE3 SHORT	OUT	Active Low	Zone 3 speaker line is shorted.
6	ZONE3 OPEN	OUT	Active Low	Zone 3 speaker line is disconnected.
7	Reserved			
8	Reserved			
9	Reserved			
10	Reserved			
11	GROUND FAULT	OUT	Active Low	Some speaker lines are grounded.
12	PA SIGNAL FAULT	OUT	Active Low	Power amplifier audio signal is faulty.
13	CHECKING/SETTING BUSY	OUT	Active Low	During measurement of the speaker line reference impedance or during check of the speaker lines.
14	REFERENCE ERROR	OUT	Active Low	The speaker line reference impedance couldn't be measured successfully.
15	GND	GND		GND
16	PA TEMP FAULT	OUT	Active Low	Power amplifier temperature is faulty.
17	COMM FAULT	OUT	Active Low	Serial Communication is faulty.
18	Reserved			
19	Reserved			
20	Reserved			
21	GND	GND		
22	CLOCK ADJ CONT	IN	One-shot make	Adjust control of Interval clock
23	SP LINE REFERENCE SETTING ACTIVATION	IN	One-shot make	Measurement of the speaker line reference impedance (Initial setting) starts.
24	SP LINE CHECK ACTIVATION	IN	One-shot make	Check of the speaker line impedance starts.
25	GND	GND		GND

MAJOR OPERATING CONTROLS & TERMINALS

Front of Unit



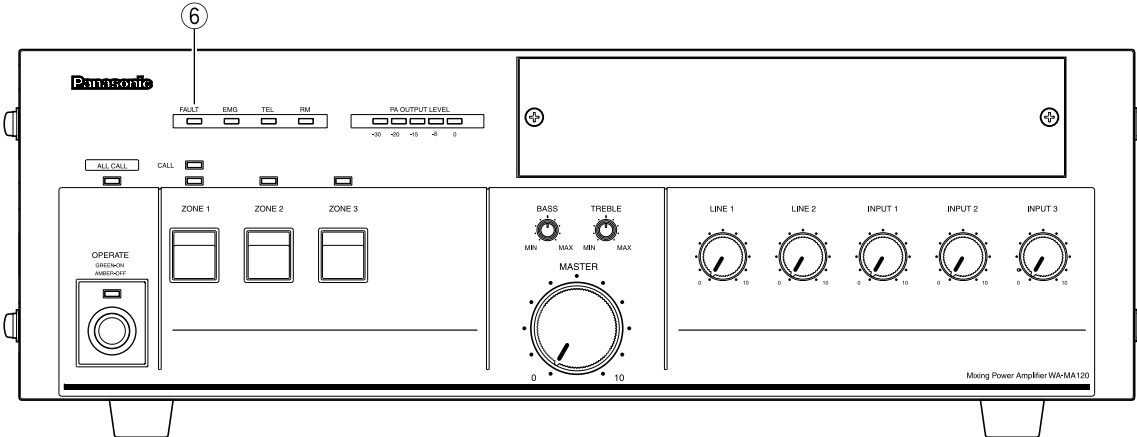
- ① SURVEILLANCE I/F Connector
- ② CHECK/SETTING Switch
- ③ SETTING STATUS Indicator
- ④ SP LINE FAULT ZONE 1-5 Indicators
- ⑤ SP LINE FAULT GROUND FAULT Indicator

Code	Indicator Condition		Meaning
	Colour	Status	
③	Amber	Lit	Reference value not set or abnormal
	Amber	Flashing	Reference value setting operation in progress
	Green	Lit	Speaker line check enabled (reference value set correctly)
	Green	Flashing	Speaker line check in progress
④	Red	Lit	Speaker line is shorted (SHORT)
	Amber	Lit	Speaker line is disconnected (OPEN)
	—	Unlit	No speaker line short or disconnection
⑤	Red	Lit	Speaker line is grounded fault
	—	Unlit	No speaker line grounding fault

SURVEILLANCE I/F Connector Signals

Pin Number	Signal Name	Meaning	Required Action
1	ZONE1 SHORT	Zone 1 short	Check for short in wiring of Zone 1.
2	ZONE1 OPEN	Zone 1 disconnection	Check for disconnection in wiring of Zone 1.
3	ZONE2 SHORT	Zone 2 short	Check for short in wiring of Zone 2.
4	ZONE2 OPEN	Zone 2 disconnection	Check for disconnection in wiring of Zone 2.
5	ZONE3 SHORT	Zone 3 short	Check for short in wiring of Zone 3.
6	ZONE3 OPEN	Zone 3 disconnection	Check for disconnection in wiring of Zone 3.
7	Reserved		
8	Reserved		
9	Reserved		
10	Reserved		
11	GROUND FAULT	Zone grounding	Grounding
12	PA SIGNAL FAULT	Power amplifier audio fault	Check the amplifier's power amplifier circuit.
13	CHECKING/SETTING BUSY	Speaker line check in progress	
14	REFERENCE ERROR	Speaker line reference value error	There is a short or ground fault in one of the speaker lines. Identify the line in accordance with the indicators or SURVEIL LANCE I/F, and check for location of the short in the applicable line.
15	GND	GND	GND
16	PA TEMP FAULT	Power amplifier high temperature fault	Check for a faulty fan, and check amplifier's power amplifier circuit.
17	COMM FAULT	Communication error notification	Check the amplifier's internal wiring. Also check the Sound Message Unit for faults.
18	Reserved		
19	Reserved		
20	Reserved		
21	GND	GND	GND
22	CLOCK ADJ CONT	Clock adjustment input	
23	SP LINE REFERENCE SETTING ACTIVATION	SP line reference setting activation	
24	SP LINE CHECK ACTIVATION	SP line check activation	
25	GND	GND	GND

Front of Mixing Power Amplifier

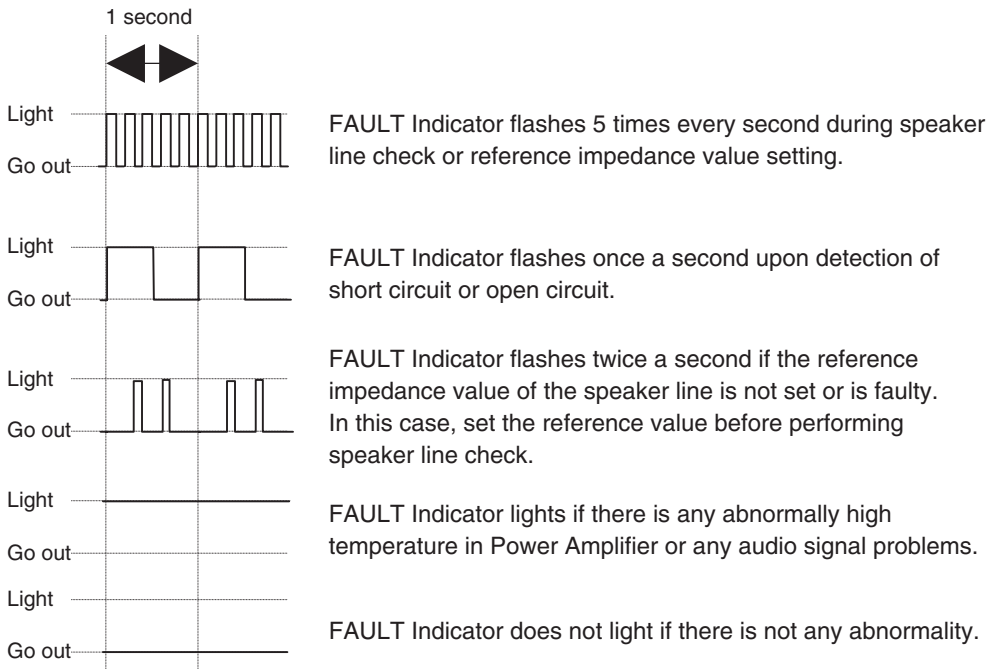


⑥ FAULT Indicator [FAULT]

When this Surveillance Unit is installed, this indicator lights upon detection of a fault.

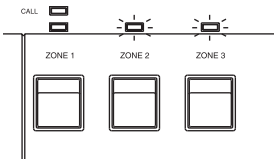
- Speaker system abnormality (short, grounding, disconnection)
- Power amplifier fault (voice system fault, abnormally high temperature)

Flashes when checking or acquiring reference value for speaker line.



(A) ZONE LED [ZONE1/ZONE2/ ZONE3]

ZONE LED of each zone light during reference value setting or speaker line check. And then they go out one after another in the order of ZONE number (from ZONE 1 to ZONE 3).



(B) Fault Indicator [FAULT]

FAULT Indicator on the front of the Amplifier flashes quickly during reference value setting or speaker line check.

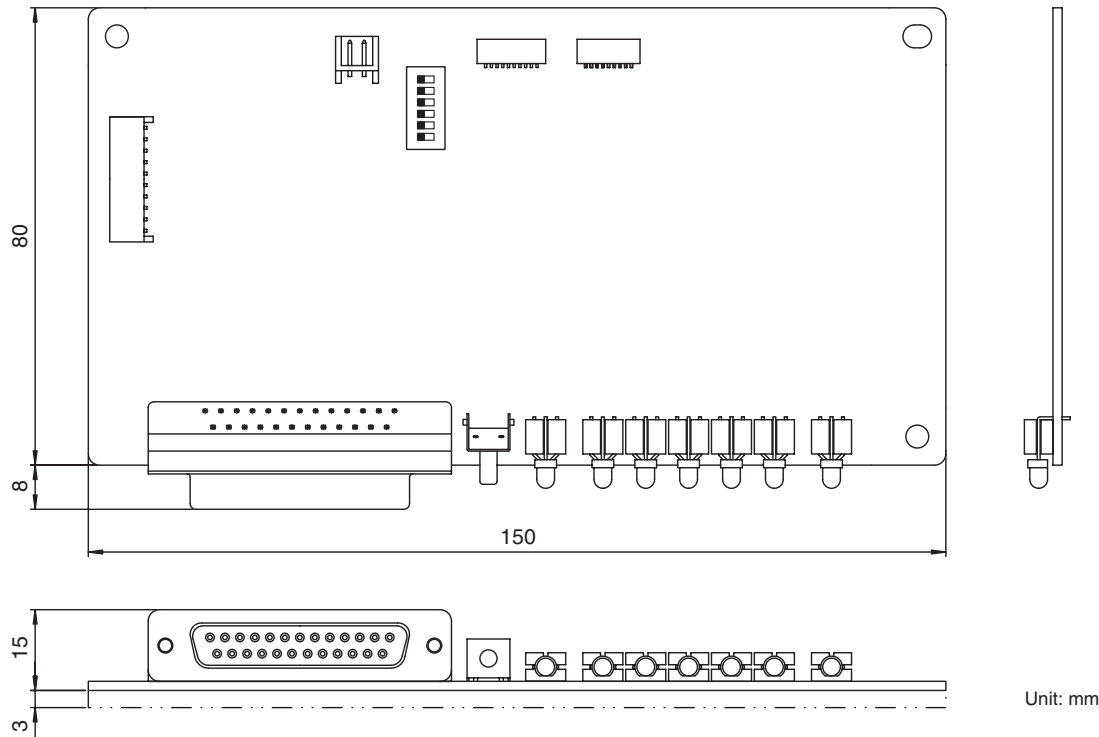
(C) SETTING STATUS Indicator [SETTING STATUS]

This indicator flashes amber during reference value setting and flashes green during speaker line check .

SPECIFICATIONS

Power Requirements	Rated Voltage	24 V DC (supplied internally by amplifier)
	Consumption Current	Approximately 100 mA
Fault Detection	Line	Short (When impedance is -50 % of reference impedance value) Disconnect (When impedance is +50 % of reference impedance value) Grounding (When ground impedance value is 50 kΩ or less)
	Amplifier	Audio fault (When audio that is greater than the pilot signal level cannot be detected by the amplifier circuit.) Abnormally high temperature (When transformer temperature is +100 °C or greater)
	SW	Speaker line check trigger/Impedance reference value acquisition trigger
	LED	Impedance reference value setting/Speaker line check status indicator (amber/green) Line short/disconnect indicator: ZONE 1-3 (red/amber) GROUND FAULT indicator (red)
Indicator Operation	SW	Line check trigger/Impedance reference value acquisition trigger
	Parallel	External I/F Input 2 (Tr input): Open circuit voltage 5 V; Short circuit current 1 mA Output 17 (open collector output): No-voltage make contact, control voltage 30 V max., control current 50 mV max. Connector: D-sub 25-pin
Other I/F	Time Adjustment	Input (Tr input): Open circuit voltage 5 V; Short circuit current 1 mA
	Dimensions	150 mm (W) x 18 mm (H) x 88 mm (D)
	Weight (Approx.)	80 g
	Ambient Temperature	0 °C to +40 °C

DIMENSIONS



CONCEPT

SYSTEM EXAMPLES

CONNECTIONS

PRODUCTS

BLOCK DIAGRAMS

CONCEPT

SYSTEM EXAMPLES

CONNECTIONS

PRODUCTS

BLOCK DIAGRAMS

Remote Control Microphone
WR-210AE



PREFACE

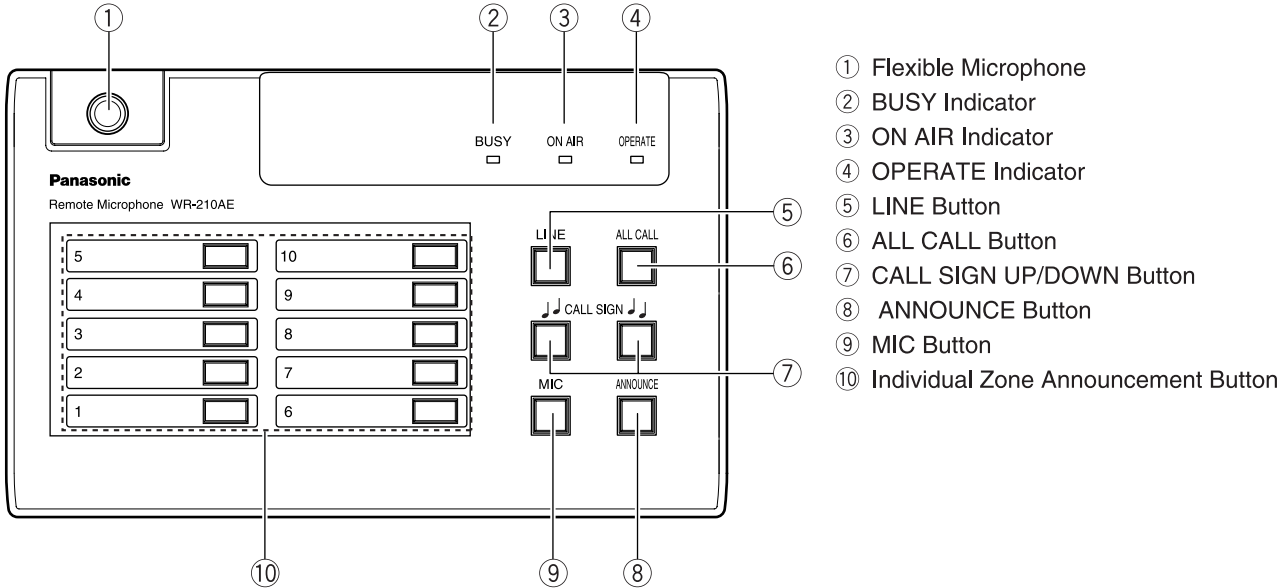
This Remote Microphone is designed for use with public address (PA) systems. It supports both separate zone announcement and all-zone announcement capabilities.

- Connecting an recording device to the Remote Microphone's REC OUT terminal makes it possible to record messages from the microphone.
- The MIC button and LINE button allow you to select MIC audio or LINE audio for announcements.
- PA system built-in call signs can be sounded using the Remote Microphone's CALL SIGN button.

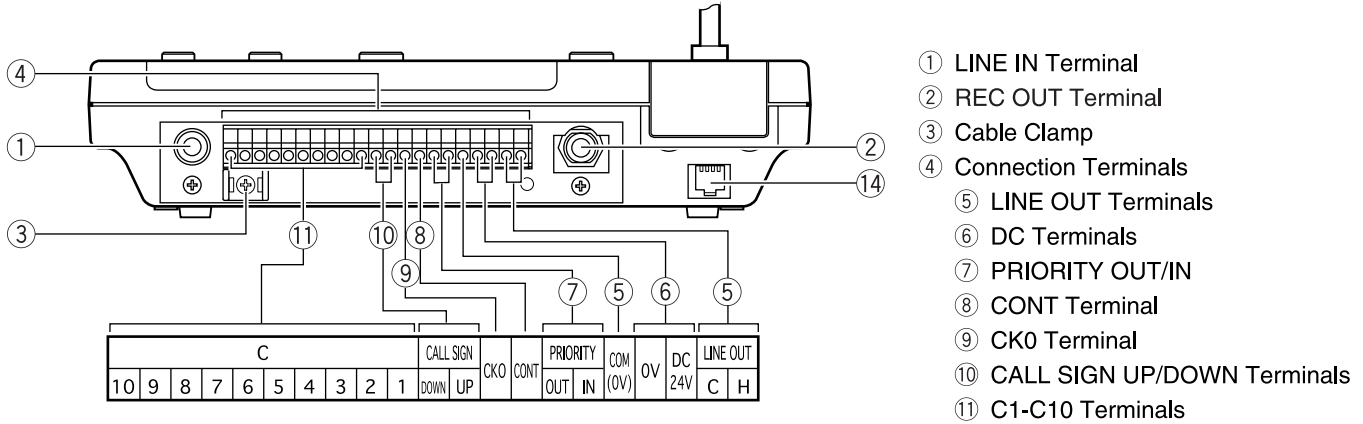
- The priority function allows you to set the order of priority between Remote Microphones if more than one Remote Microphone is connected.
- The BUSY indicator shows the current busy status of the Remote Microphone.

MAJOR OPERATING CONTROLS & TERMINALS

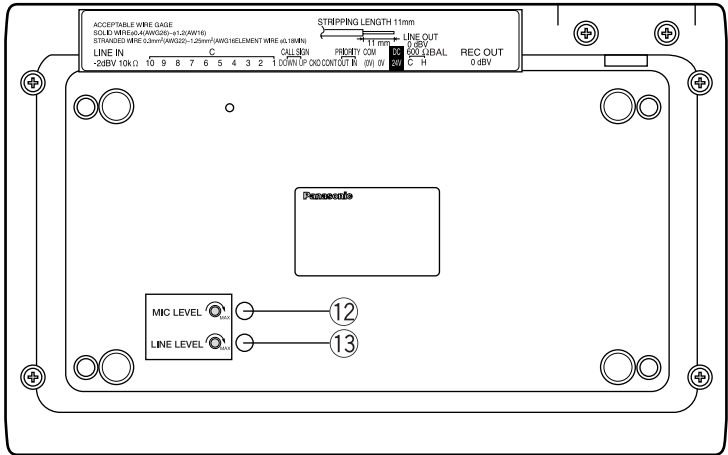
Front View



Rear View



Bottom View



MEMO

SPECIFICATIONS

General	
Power Supply	24 V DC, 45 mA or less (connection terminal)
Ambient Temperature	0 °C - +45 °C
Dimensions	250 (W) mm x 55 (H) mm x 155 (D) mm (excluding projections and flexible microphone)
Weight	Approx. 740 g {1.63 lbs}
Finishing	Top case: OA ivory color (Munsell value 5.5Y7.5/0.3 approximate color) Bottom case: Gray color (Munsell value N5.5 approximate color)

Audio-signal Input/Output

Frequency Characteristic	Line: 50 Hz-15 000 Hz -3±2 dB
Distortion	1 % or less (at 1 000 Hz)
Microphone Input	Unidirectional ECM microphone length: 350 mm Input Sensitivity: -49 dBV (-44 dBV at factory)
SN Ratio	50 dB minimum
LINE IN	ø 6.3 mm tip sleeve phone jack unbalanced Input Sensitivity: -12 dBV (-2 dBV at factory) Input impedance 10 kΩ
SN Ratio	70 dB minimum
Audio Output	Connection terminal H,C, COM (0 V) balance Output Level:0 dBV, matching load impedance 600 Ω
Record Output	ø 6.3 mm tip sleeve phone jack unbalanced Output Level:0 dBV, matching load impedance 10 kΩ

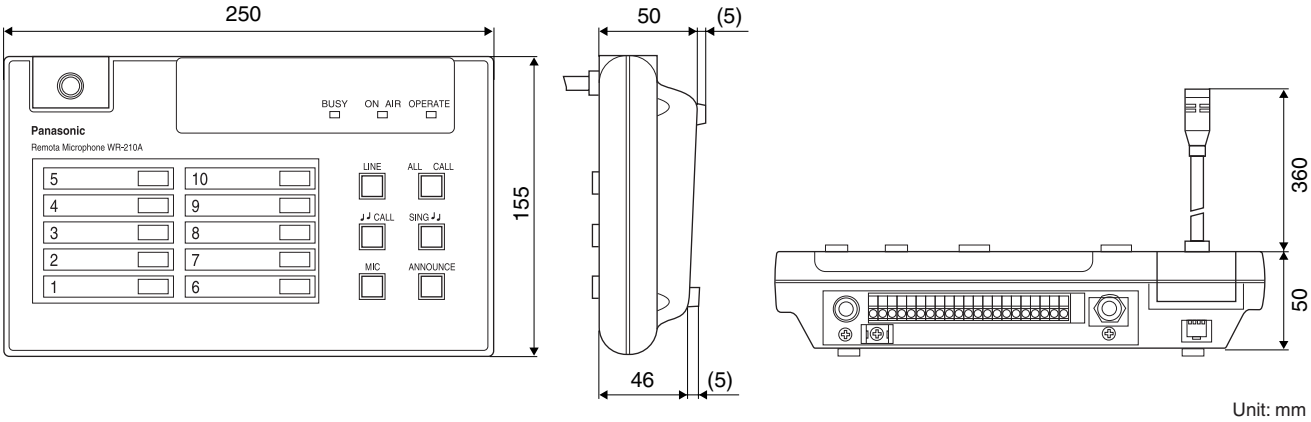
Control Output (Quick connection terminal panel)

Control Capacity	Max: 30 V DC, 80 mA DC
Announcement Control	1 channel
Zone Control	1-10 channel
All-Zone Control	CK0 one channel
Call Sign Control	Rising, falling, 1 channel each
Priority Control	Priority input, priority output 1 channel each

Other

Operation Buttons	Individual, microphone, channel, all-zone, call sign up/down, announce
Indicators	OPERATE, ON AIR, BUSY
Extension I/F Connector	1

DIMENSIONS



CONCEPT

SYSTEM EXAMPLES

CONNECTIONS

PRODUCTS

BLOCK DIAGRAMS

CONCEPT

SYSTEM EXAMPLES

CONNECTIONS

PRODUCTS

BLOCK DIAGRAMS

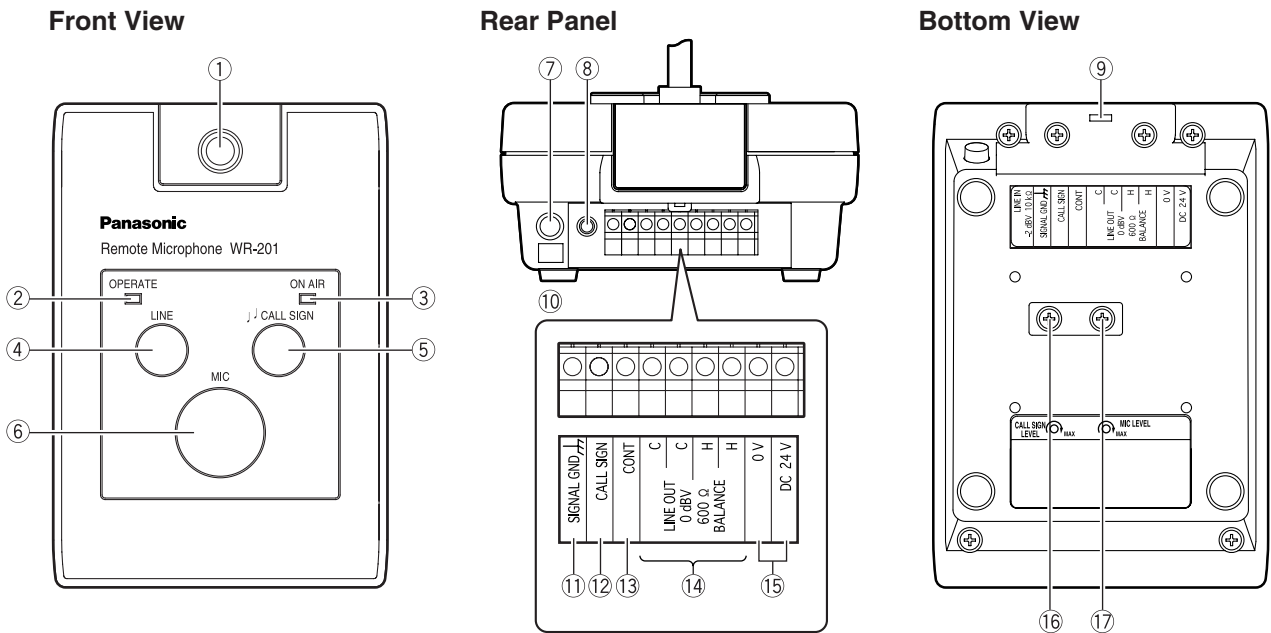


PREFACE

This single-channel Remote Microphone is designed for use with public address (PA) systems.

- A LINE IN terminal is available to connect an external sound source such as a CD player or background music (BGM) device.
- The CALL SIGN button on the Remote Microphone can be used to play the call signs that are on the PA system.

MAJOR OPERATING CONTROLS & TERMINALS



- ① Flexible Microphone

② OPERATE Indicator

③ ON AIR Indicator

④ LINE Button

⑤ CALL SIGN Button

⑥ MIC Button
- ⑦ LINE LEVEL Volume Control

⑧ LINE IN Terminal

⑨ Cable Clamp

⑩ Connection Terminals

⑪ SIGNAL GND Terminal

⑫ CALL SIGN Terminal
- ⑬ CONT Terminal

⑭ LINE OUT Terminals

⑮ DC Terminals

⑯ CALL SIGN LEVEL Volume Control

⑰ MIC LEVEL Volume Control

SPECIFICATIONS

General	
Power Supply	24 V DC, 45 mA or less (connection terminal)
Ambient Temperature	0 °C - +45 °C
Dimensions	107 mm (W) x 55 mm (H) x 155 mm (D) (excluding projections and flexible microphone)
Weight	Approx. 400 g {0.88 lbs}
Finishing	Top case: OA ivory color (Munsell value 5.5Y7.5/0.3 approximate colour) Bottom case: Gray color (Munsell value N5.5 approximate colour)

Audio-signal Input/Output

Frequency Characteristic	Line: 50 Hz-15 000 Hz -3 dBV±2 dBV
Distortion	1 % or less (at 1 000 Hz)
Microphone Input	Unidirectional ECM microphone length: 350 mm Input Sensitivity: -49 dBV (-44 dBV at factory)
SN Ratio	50 dB minimum
LINE IN	ø3.5 mm stereo mini phone jack Input Sensitivity: -12 dBV (-2 dBV at factory) Input impedance 10 kΩ
SN Ratio	70 dB minimum
Audio Output	Connection terminal H,C, 0 V balance Output Level:0 dBV, matching load impedance 600 Ω
CALL SIGN	2 falling tones

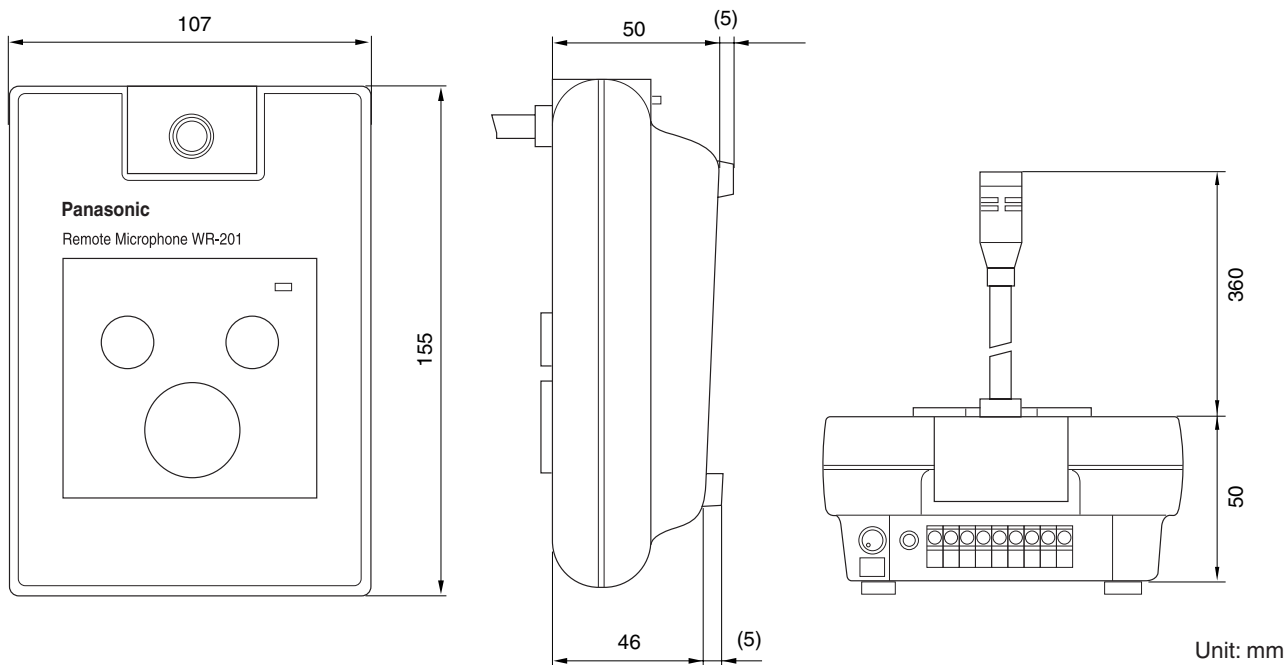
Control Output

Announcement Control	1 channel	Max: 30 V DC, 160 mA DC (rating of contacts)
Call Sign Control	1 channel	Max: 30 V DC, 80 mA DC (rating of contacts)

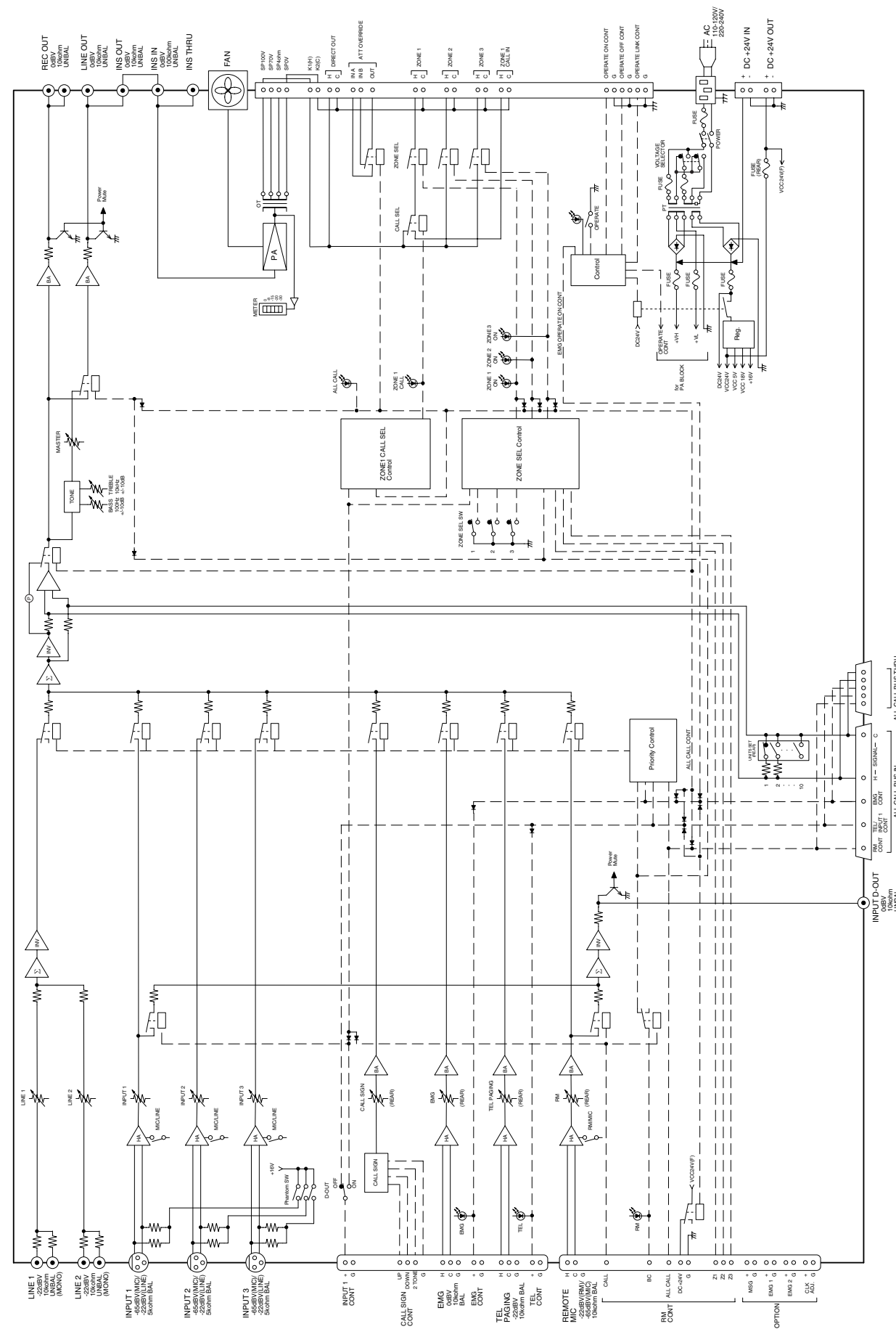
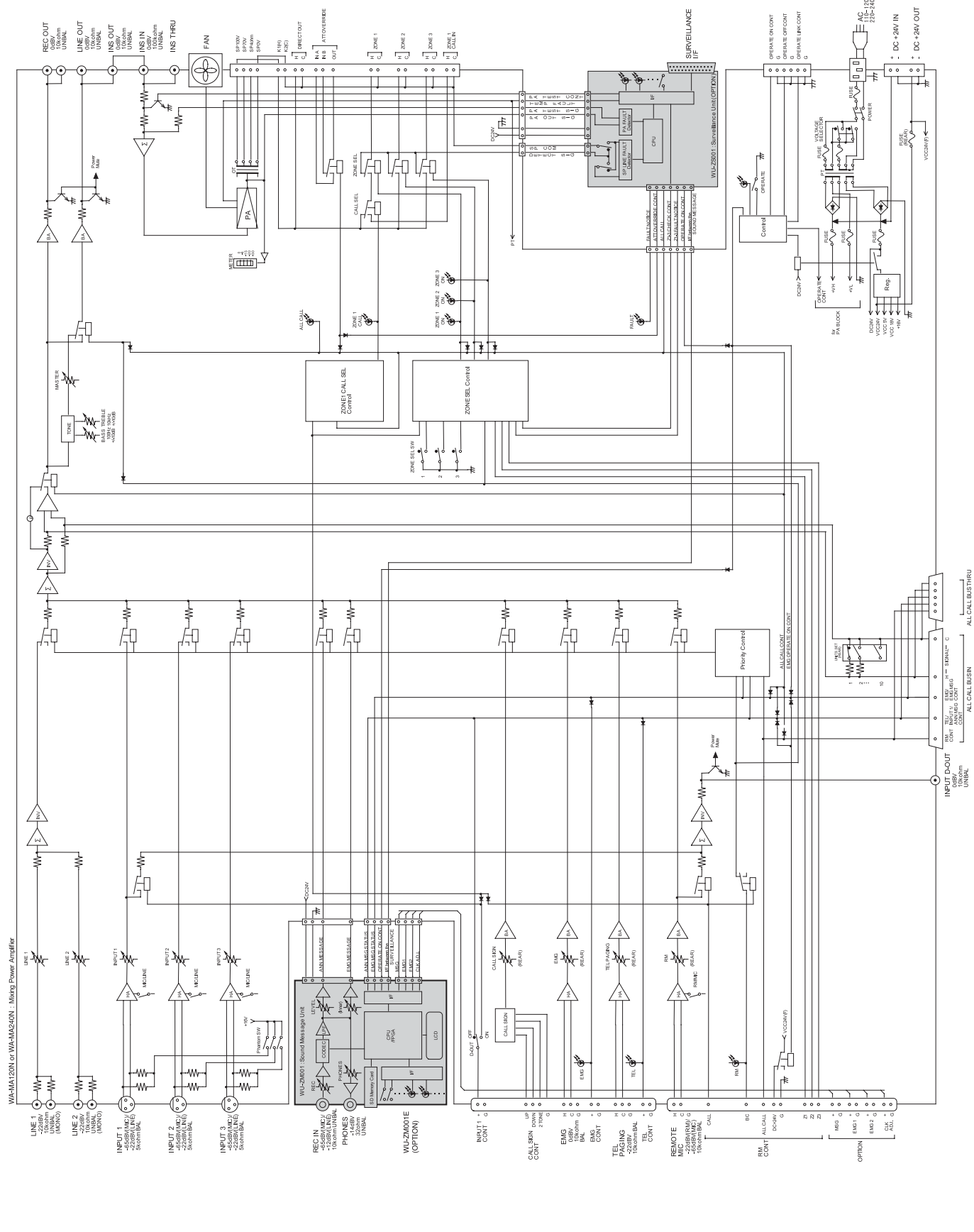
Other

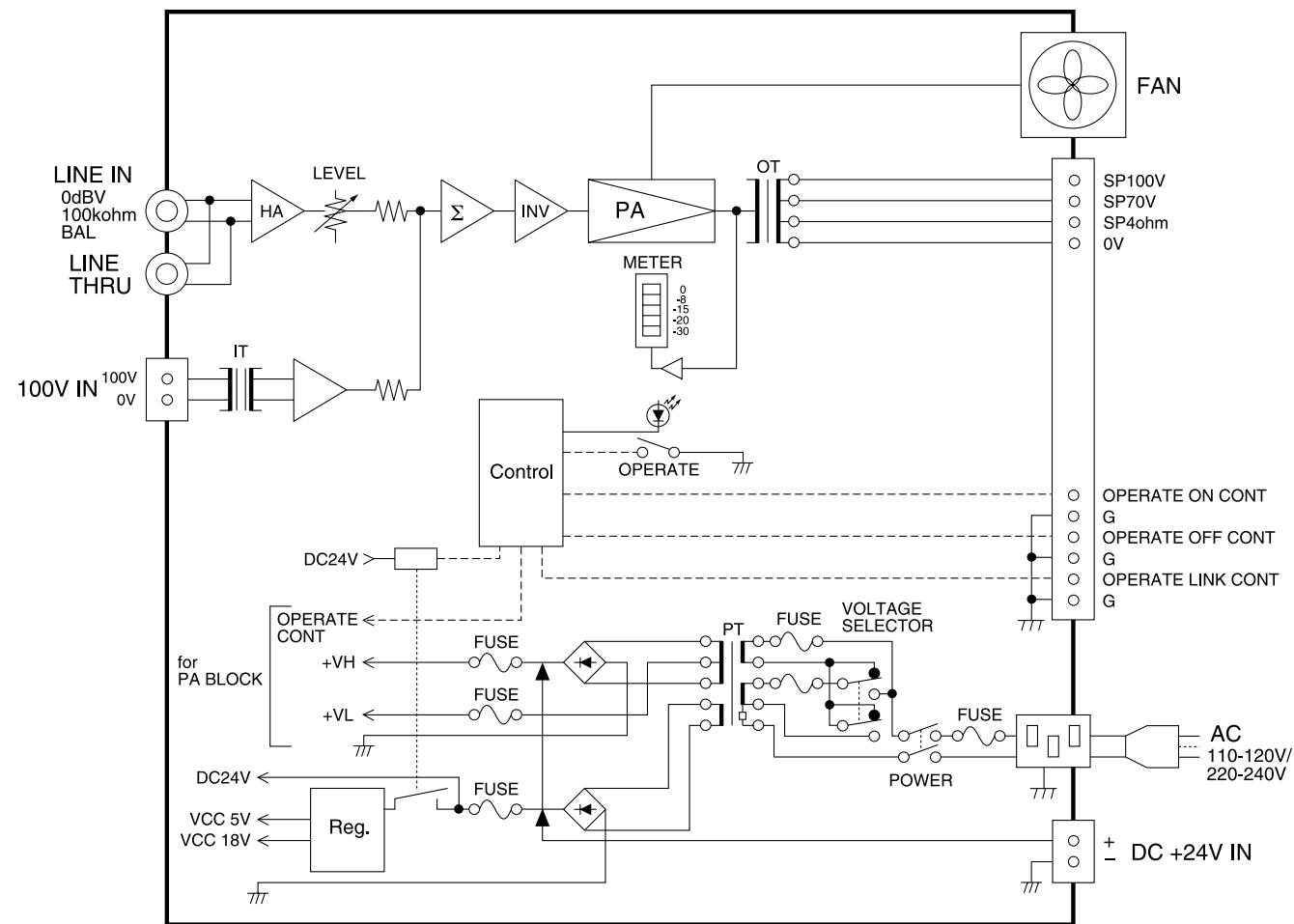
Operation Buttons	microphone, LINE, call sign
Indicators	OPERATE, ON AIR

DIMENSIONS

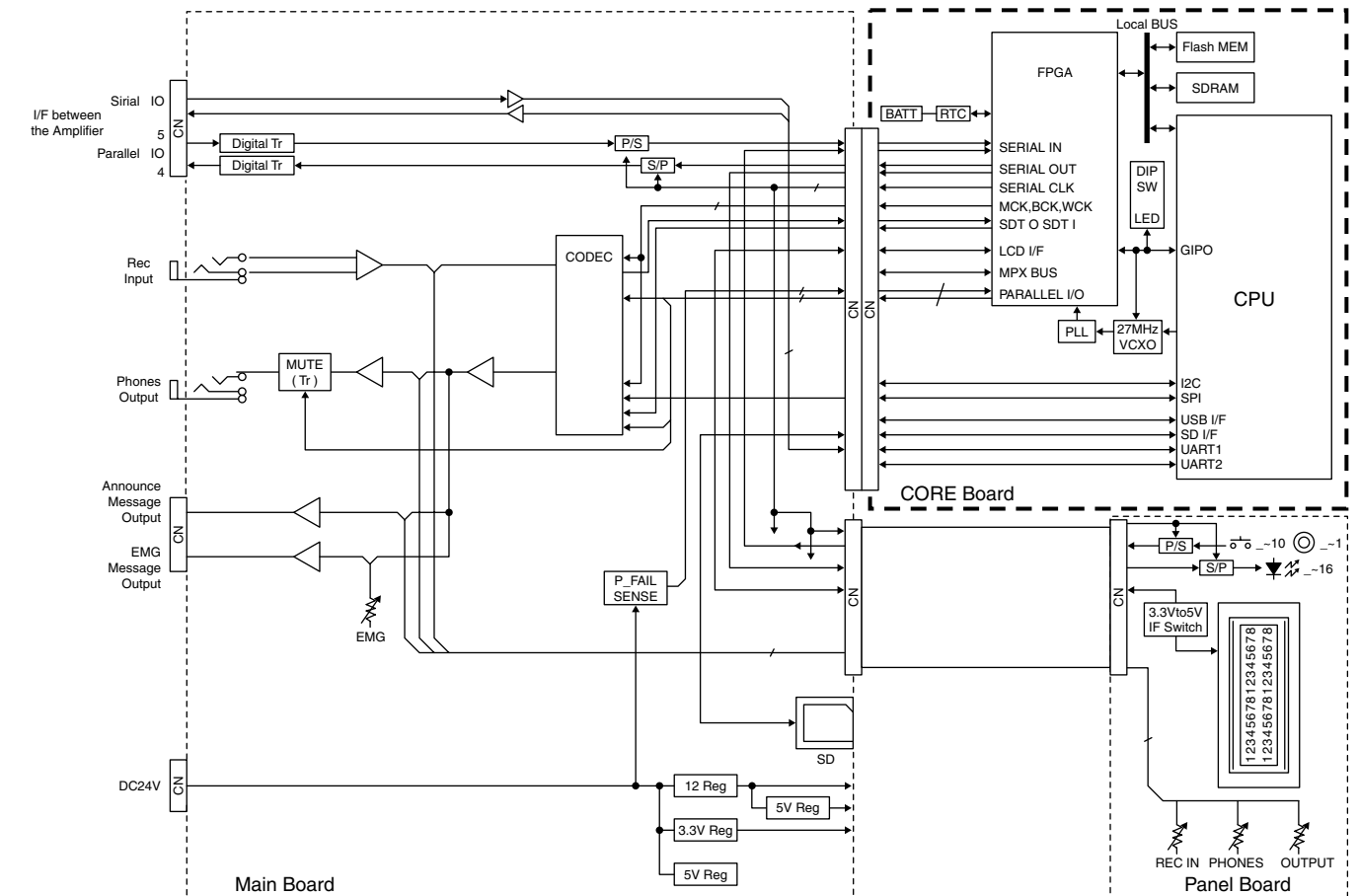


Unit: mm

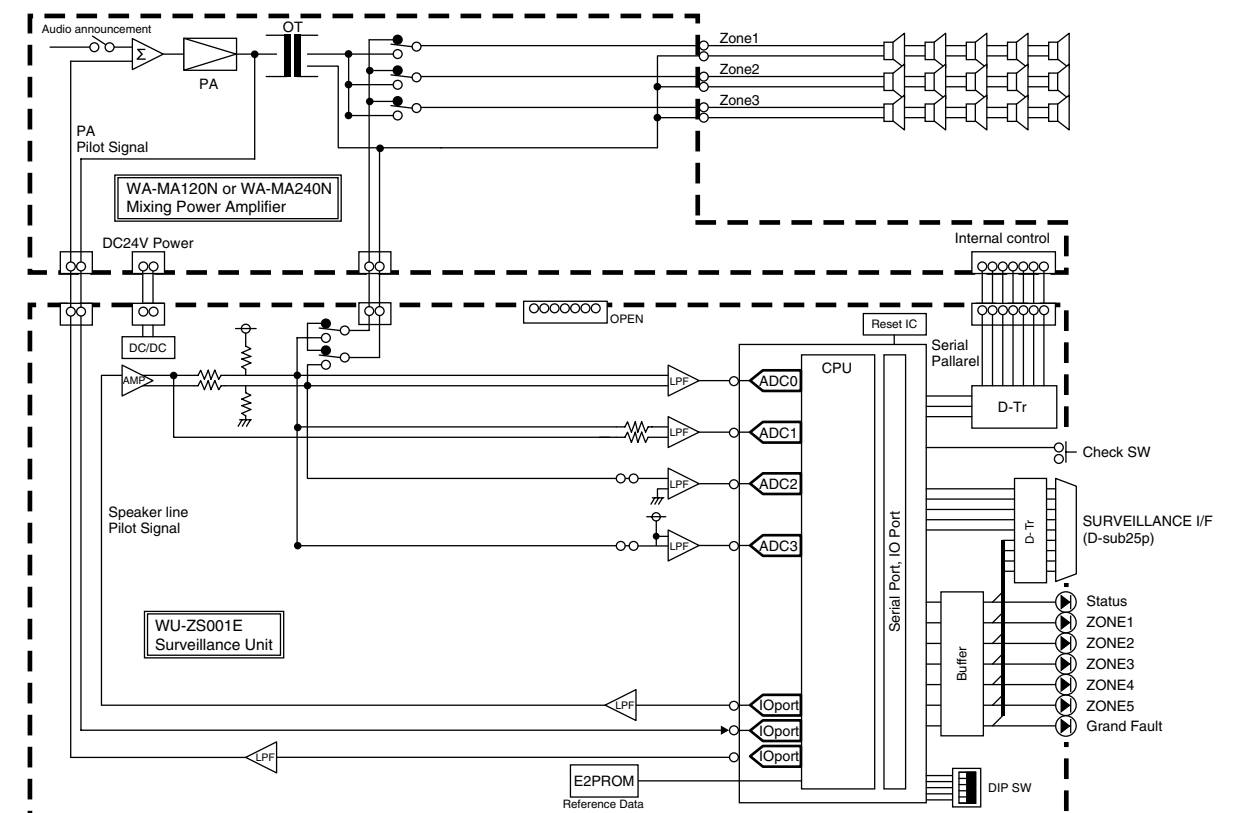


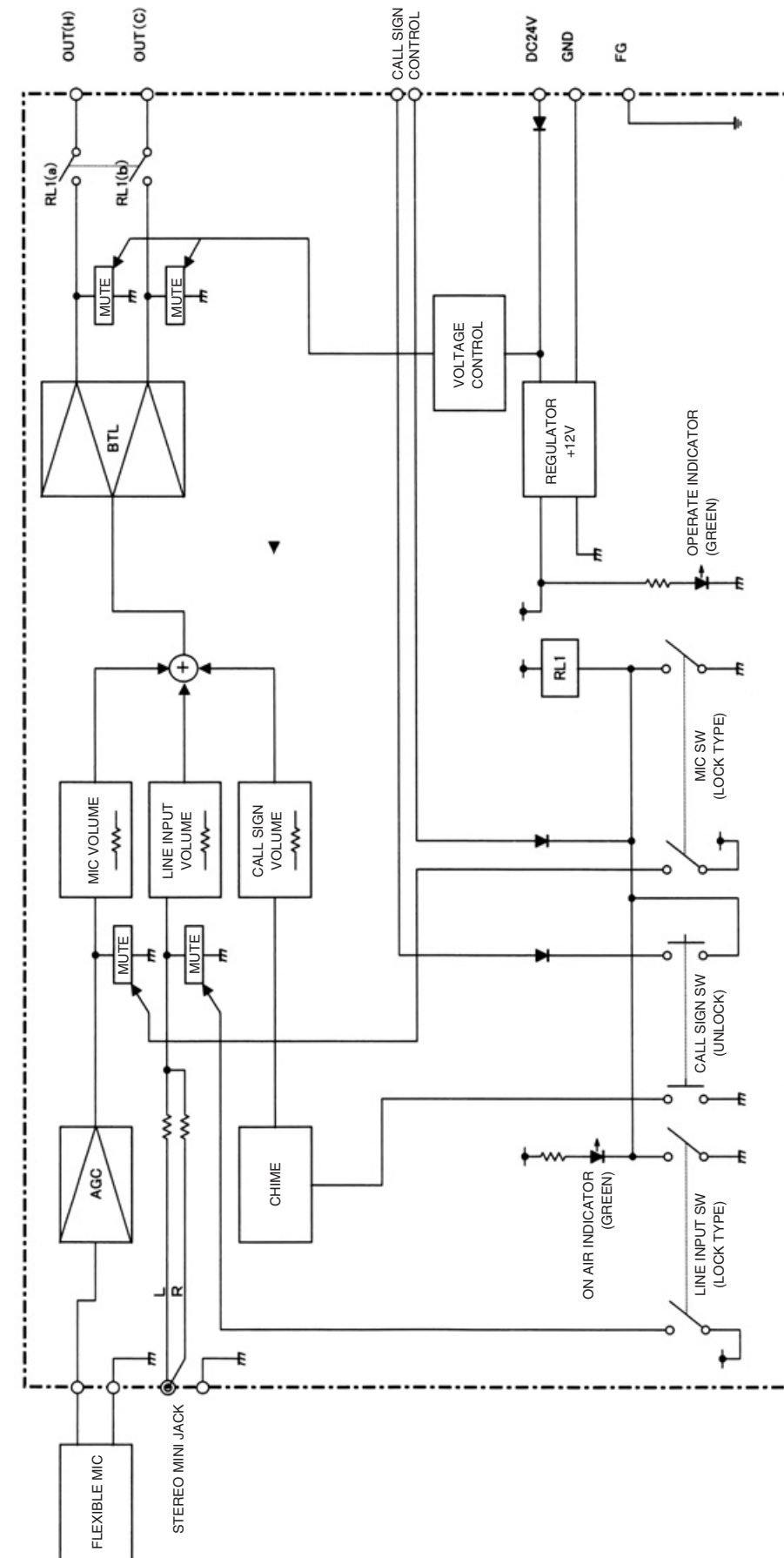
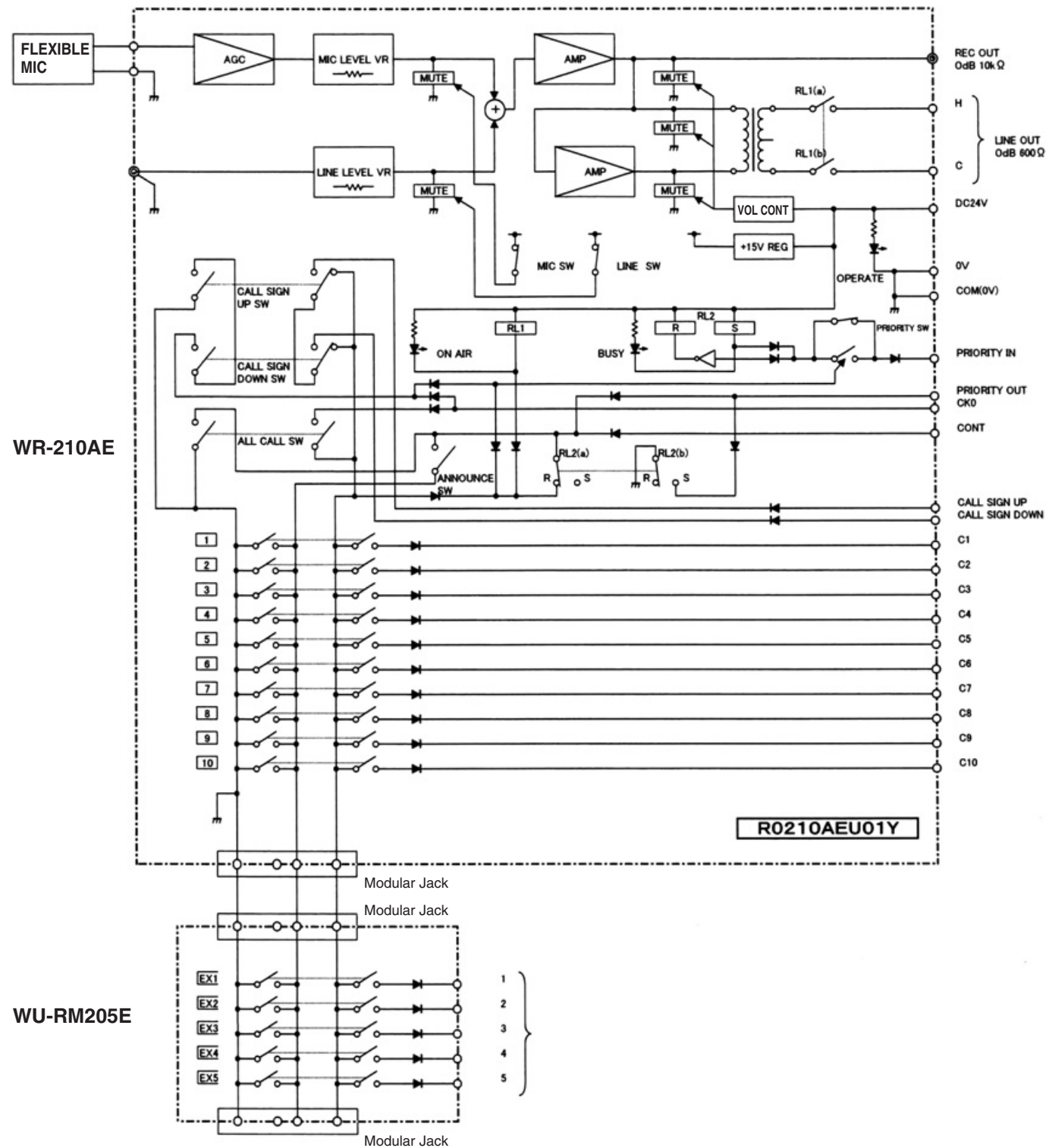


WU-ZM001E



WU-ZS001E





Colors of Speakers

When choosing speakers, it is important to consider the structure or wood quality of the building or the interior.

As much as possible, Panasonic speakers have been designed to harmonize with a variety of interiors.

Because building interiors tend to be predominantly white, we have used it as the standard underlying tone.

To accentuate the mood of your interior, simply choose the most appropriate shade.

Integrated White (Munsell 10Y9/1)	Off White (Munsell 5Y8.5/1)
WS-TN05N WS-TN06N 	WS-2330N WS-2335N WS-2360N 
Ivory White (Munsell 2.1Y7.7/1)	Light Gray (Munsell N7)
WT-7015N 	WT-610N WT-615N WT-H500N WT-H600N 

* Due to printing irregularities, actual shades may vary slightly from the illustration.

Trademarks and registered trademarks

- Microsoft, and Windows are registered trademarks of Microsoft Corporation in the U.S. and other countries.
- SD logo is a trademark.

Important

- Safety Precaution: carefully read the operating instructions and installation manual before using this product.

- All TV pictures are simulated.
- Weights and dimensions are approximate.
- Specifications are subject to change without notice.
- These products may be subject to export control regulations.

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